The CHEMIST AND DRUGGIST

Established 1859 28 Essex Street, Strand, London, W.C.2. *Registered as a Newspaper*

No. 2745
VOL. CXVII. SEPTEMBER 17, 1932 *Annual Subscription (with Diary)* 20/-. *Single Copies* 9d.

Index to Advertisers, pp. 5 & 6.

THE NEW 6D ZIM SERIES

Under the name of Zim we are introducing 4 articles to retail at the popular price of 6d. These can be sold at a good margin of profit and do not displace any higher priced products.

The pack is original in conception, and a most attractive composite show-card is supplied advertising the series and a substantial turn-over is assured.

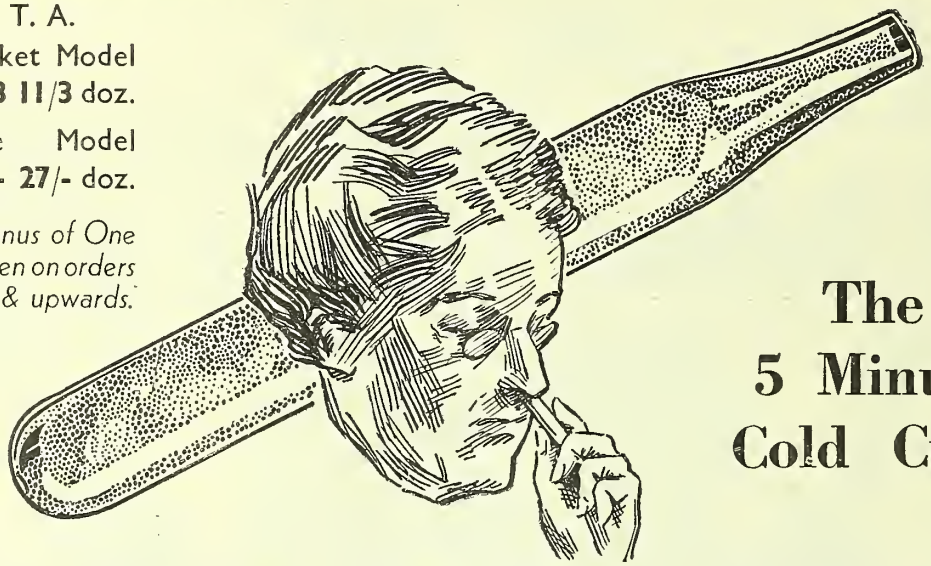
INHALANT	For Colds, Influenza, etc. Sprinkler-necked bottle, cartoned.	
TOOTHACHE TINCTURE	In a similar pack.	**3/9 DOZ.**
CORN CURE	Corked bottles, viscose caps.	**3/6 DOZ.**
VAPOURSTICK	A new departure, it comprises a solid form of the popular chest rub formula, in a handy pack.	**I Gross Assorted**

ARTHUR·H·COX·&·CO·LTD
Manufacturing Chemists
BRIGHTON·ENGLAND

A A

P. A. T. A.
Vest Pocket Model
Retail **1/3 11/3** doz.
Refillable Model
Retail **3/- 27/-** doz.

Display bonus of One to the Dozen on orders of 3 doz. & upwards.



The 5 Minute Cold Cure

PROFIT and PRESTIGE

A display of the LITTLE VICTOR brings you both. The terms safeguard the profit and the LITTLE VICTOR reflects credit on those who recommend and sell it.

Satisfied customers return for more and advise their friends to purchase this wonderful little curer of Colds, Catarrh, Influenza, and Hay Fever.

The LITTLE VICTOR is used by the leading operatic and theatrical stars, members of Parliament, and all others who use the voice and know how to care for it.

An Inhaler for personal use will be sent Free to any Pharmacist on request

The Little Victor INHALER

Order through your usual wholesaler or from

Cockburn & Co., Ltd., 130/140 Howard St., Glasgow

INDEX TO ADVERTISERS

[*Continued overleaf.*

INDEX—cont.

The New
1/- size
"Lady Gay"
Perfume by
Parfumerie de Fleury
is now enjoying an
appreciative sales
response and an enviable
record of acceptance
throughout the country

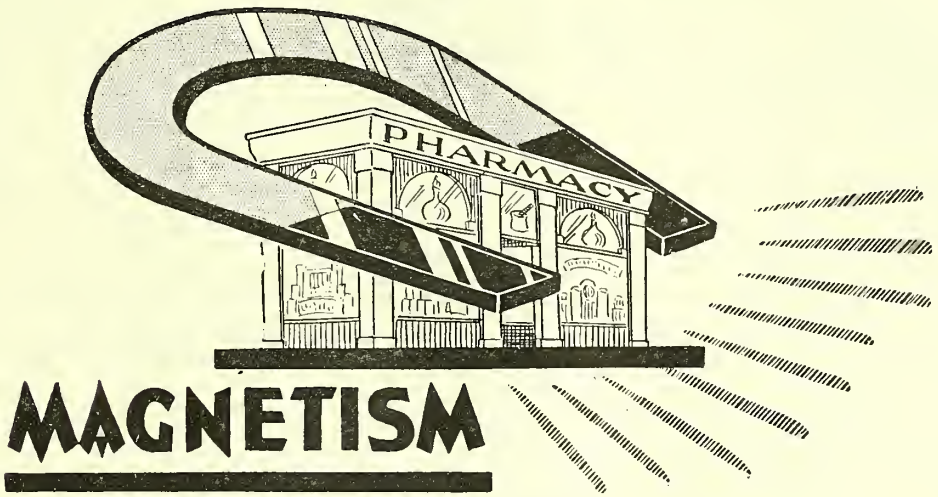
DE FLEURY

PERFUMES & TOILET DELIGHTS

A display of *Parfumerie de Fleury* in your window will very soon *prove* to you the *money-making* possibilities of this new series

PARFUMERIE DE FLEURY RAWDON LEEDS

Maw's Page



MAGNETISM

Is your pharmacy a business magnet? Is it a centre of attraction or merely one of a row of shops? Does it draw customers to your counter and hold them there? Does it pull business away from your outside competitors?

Your pharmacy ought to be outstanding. It ought to be impossible to pass without noticing it. It ought to reflect your personality and the proper atmosphere of pharmacy. At the same time it ought to show and sell your goods successfully.

To design and build pharmacies like this is not easy. It requires knowledge and experience of shopfitting technique and, above all, it demands pharmaceutical training. A good ordinary shop may be a bad pharmacy and pharmaceutical shopfitting is a thing apart.

Maw's are truly pharmacy designers and constructors. They have been bred in the pharmaceutical atmosphere, and have grown up with pharmaceutical traditions. A "Maw" pharmacy combines all that is best in pharmacy with all that is best in business. It is a profit maker and a prestige builder. It is a sound investment, a safeguard of future prosperity.

If you are contemplating any fitting work, from the installation of a simple showcase to complete equipment or reconstruction of a pharmacy, consult Maw's. We will help you with suggestions, sketches and estimates of cost.

S. Maw, Son & Sons, Ltd.,
Aldersgate St., London,
and Barnet.

TRADE MARK

Every Batch Standardised

EVANSOL is the Lysol of distinction; always reliable. It contains 50% distilled cresylic acid; is perfectly soluble in hard or soft water—a pleasant odour, and leaves no "film" on surgical instruments.

Supply "EVANSOL" and you ensure satisfaction. The illustration above shows the attractive Display Material provided, and includes brightly-coloured crêpe paper in two shades.

EVANS SONS LESCHER & WEBB LTD

LIVERPOOL DUBLIN LONDON

Sensational Sales of "SNOW"

THE NEW RAZORLESS SHAVE

WRITE FOR THE ATTRACTIVE

WINDOW DISPLAYS

which will attract and keep a crowd of fascinated people at your window

Window display 101 (19″×29″ Men—Part)

Window display 103 (56″×29″ Men and Women)

Counter card 106 (8″×12″)

"SNOW" SALES

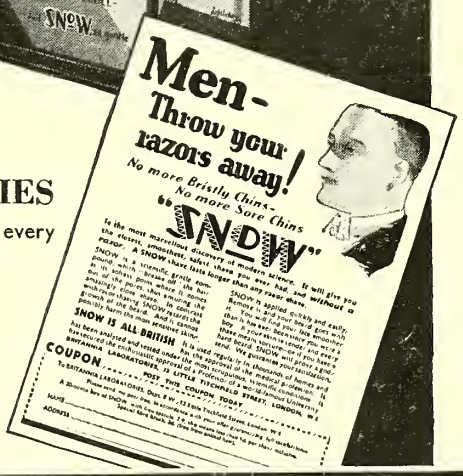
are backed by National Advertising

21 MILLION FAMILIES

read "SNOW" advertisements every week or fortnight in

LEADING NEWSPAPERS AND PERIODICALS

Here is a typical "SNOW" advertisement →



YOU ONLY NEED TO STOCK "SNOW"

OUR ADVERTISING AND WINDOW DISPLAYS move it off your shelves

BUY "SNOW" UNDER OUR

BONUS OFFER

(Introduction Offer good until October 3rd, 1932)

The large package of "Snow" with spatula and superfine fibre brush is sold at 3/-. You buy

12 large pckgs. of "Snow"		25/-
1	" " " "	FREE
13	" " " "	25/-
Sells at		39/-

FILL UP COUPON AND POST IT AT ONCE

POST THIS COUPON TO-DAY!

THE BRITANNIA LABORATORIES, 13 Little Titchfield St., LONDON, W.1

Deliver the following :—

12 large boxes of "Snow"	... ...	25/-
1	" " "	... ...	FREE
★ 13	" " "	... ...	25/-

Furthermore deliver immediately :—

.....Window display No. 101 .....Window display No. 103

.....Counter cards No. 105

My Wholesaler is.....

My Name.....

My Address.....

★ If less than a dozen is ordered delivery will be made through your wholesaler. Dozen orders will be dispatched direct from our factory but they will be billed through your wholesaler.

Crème Siamoise is now being manufactured in England. This famous French product will effect more sales for you. Attractively packed and with handsome Show material, it will prove an attraction to all up-to-date establishments. Whilst the high quality is being maintained, every endeavour has been made to keep the prices at a popular level. Advertising has already begun and an intensive campaign is being developed.

PRICES:

CRÈME SIAMOISE
Nuit and Jour.

		Dozen
Sac Tubes...	6d.	... 4/-
Large ,, ...	1/6	... 12/-
Small Jars...	1/6	... 12/-
Medium ,, ...	2/-	... 16/-
Large ,, ...	3/6	... 28/-
Mixed ,, ...	4/-	... 32/-

LAQUE SIAMOISE
(Cream Rouge)
Jars 2/6 ... 20/- Dozen

POUDRE SIAMOISE
Small Box 1/6 ... 12/- Doz.
Large ,, 2/3 ... 18/- ,,
(Naturelle, rachel clair, rachel foncé, rose, blanche, clair, pêche, ocre, mauresque.)

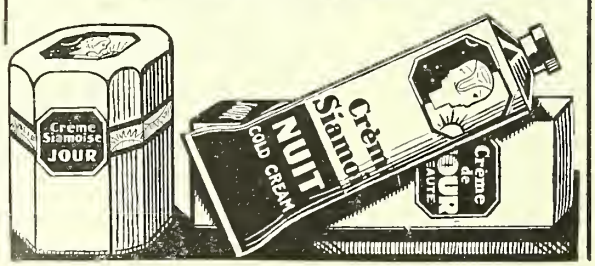
13 to the dozen through your Wholesaler or direct from the

Sole Sales Concessionnaires for the British Isles and Dominions

CHARLES ROGER Laboratories Ltd.
15 Great James Street, London, W.C.I.

WRITE FOR SPECIAL DISPLAY TERMS.

Crème Siamoise



Everywhere

women are demanding "IVA" the real fur puff that washes...

Our Advertising continues . . . The interest of all women is definitely aroused . . . Letters are reaching us from all over the country . . . You will find it profitable to keep a prominent display of the puff that all the talk's about.

"IVA" is the easy-to-remember name for the only fadeless, washable, real fur powder puff. It is guaranteed 100% hygienic, made in the newest pastel and fashionable shades—and it is British.

"IVA" Fur Puffs are retailed at popular prices ranging from 6d. upwards, showing the full trade profit on all lines, with the usual discount terms. **For example, the 6d. puff costs you 4/3 per dozen, the 9d. puff 5/9 per dozen, the 1/- puff 7/9 per dozen, and so on.** A wide range of Sports and Handkerchief puffs are also available.

The wholesale houses have comprehensive stocks ready for your demands.

WHOLESALE STOCKISTS OF "IVA" FUR PUFFS from whom you can obtain full details and stocks of all styles.

R. HOVENDON & SONS LTD., 89-95, City Road, E.C.1 29, Berners Street, W.1
BUTLER & CRISPE LTD., 80/84, Clerkenwell Road, E.C.1
BARCLAY & SONS LTD., 95, Farringdon Street, E.C.4
SANGERS LTD., 42a, Hampstead Road, N.W.1
HEWLETT & SONS LTD., 35, Charlotte Street, E.C.2
WILLIAM TOOGOOD LTD., 77, Southwark Street, S.E.1
WATTS BROS. LTD., 72, Cannon Street, Manchester
SINGLE DALBY & CO., 42, Oldham Road, Manchester
T. & H. SMITH LTD., 32/4, Virginia Street, Glasgow
LORIMER & MOYES LTD., 7, Montrose Street, Glasgow 11, Waterloo Place, Edinburgh
HEATH BROS., 101/3, Chapel Street, Salford
JOHN J. DENTON LTD., 7, Williamson Square, Liverpool
JAMES TOMPKINS LTD., 386, City Road, E.C.1
CHARLES JONES, RADFORD & CO., LTD., 80, Coleman Street, E.C.2
KEN & CO. LTD., 56, Rathbone Place, W.1
SILK'S TOILET CO., 8, Red Lion St., London, W.C.1
FRANCIS NEWBURY & SONS LTD., 27, Charterhouse Square, London, E.C.1

IVA FUR PUFFS

100% HYGIENIC

THE "IVA" MANUFACTURING COMPANY, 25-29 BANNER STREET : LONDON : E.C.1

ANTISEPTIKOL is a thoroughly efficient fragrant and refreshing Dental Cream, each tube is filled with a preparation that will cleanse, brighten and whiten teeth with protection from caries, also possessing the added virtues of keeping gums firm and the entire oral cavity in an aseptic and healthy condition. It makes no extravagant claims, but will uphold the prestige of the Chemist in recommending items that will honestly benefit his patrons.

This showcard is particularly striking. The colour scheme being Silver, Green, Black and Vermilion. Monochrome does not do it justice, and as an attraction and business compeller it will be found unequalled either in window or on counter. It will make sales almost automatic, thus saving valuable "sales time" for you and your assistants in their busy day.

ANTISEPTIKOL

1/- Tube

Proprietors and Manufacturers
ANTISEPTIKOL Ltd.
Sole Wholesale Distributors
J. C. GAMBLES & CO. Ltd.
211-215, Blackfriars Road, London, S.E.1

per doz. 8/-

Everywhere there is a growing demand among men for a really good Hair Cream - that is why

'JULYSIA' SALES GO UP UP UP

JULYSIA arouses the enthusiasm of client and chemist alike. Men like it because it gives them all they wish for in a hair cream at a very moderate price. Chemists like it because it assures them a steadily-moving line allied with substantial profit. Read these details of our bonus scheme :—

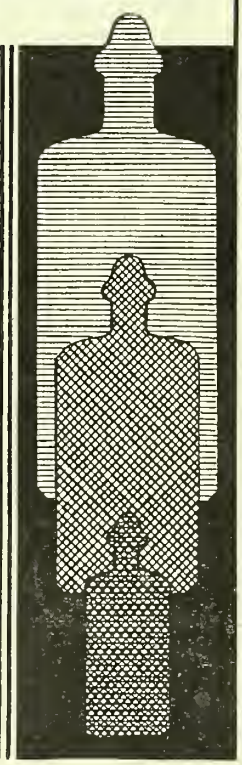
"JULYSIA" CREAM IS PACKED IN TWO SIZES
1/- size at 8/- doz. 1/6 size at 12/- doz.

BONUS TERMS—13 bots. to the doz.
SPECIAL CARRIAGE PAID PARCELS On Bonus Terms :—

No. 1 PARCEL
4 dozen 1/- size
With FREE BONUS of 4 × 1/- Bottles and 4 × 1 pints for Saloon use

No. 2 PARCEL
3 dozen 1/- size. 1 dozen 1/6 size
With FREE BONUS of 3 × 1/- & 1 × 1/6 Bottles and 4 × 1 pints for Saloon use

"JULYSIA" is also supplied in Bulk for Saloon use :—
7/6 gallon, 4/- half gallon, 1/6 pint



A PRODUCT OF JULES FRÈRES LTD

Perfumers, 154-164 WALWORTH ROAD, LONDON, S.E.

Send for Terms

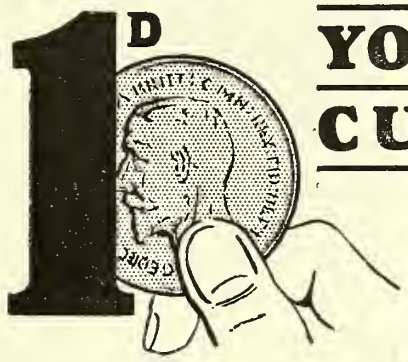
PARKE, DAVIS & CO., BEAK STREET, LONDON, W.1

Laboratories : Hounslow, Middlesex : Inc.U.S.A., Liability Limited

PAM

SANITARY PADS STAND FOR SERVICE TO YOUR WOMEN CUSTOMERS

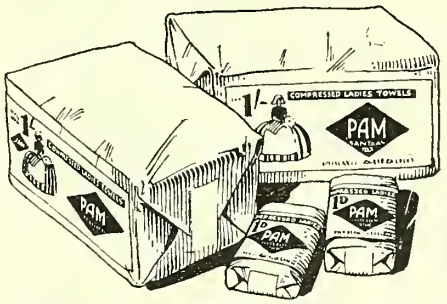
Quick Sales— Makes New Custom— and 50% Profit on Cost



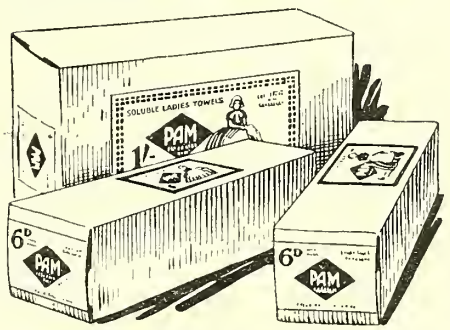
The PAM Popular Size Compressed Ladies' Towel is the **only** penny towel individually packed. The outer label around each towel can be slipped off, leaving the packet entirely plain. Immediately the package is opened, the towel is ready for use, without "pulling out" or warming.

PAM Compressed Towels offer perfect protection for One Penny (Popular Size) . . . . There are also medium and large sizes, as well as PAM Soluble and Standard (Cotton Wool) Towels in all sizes.

HAVE YOU HAD YOUR BONUS PARCEL YET?



COMPRESSED (Loop or Tab Ends)



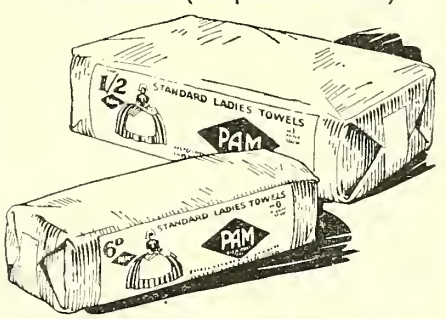
SOLUBLE (Loop or Tab Ends)

1 DOZ. ANY 6d. PACKETS FREE WITH 45/- ORDER

½ DOZ. ANY 6d. PACKETS FREE WITH 25/- ORDER

¼ DOZ. ANY 6d. PACKETS FREE WITH 15/- ORDER

The Packets make the display. Show them in your Shop.



STANDARD (De Luxe Cotton Wool)

Clifford G. Froom (Sales Service)

PAM MANUFACTURING CO. LTD.

10 KINGLY ST., REGENT ST., LONDON, W.1

● REPRESENTATIVES WANTED ON COMMISSION TO SECURE FURTHER DISTRIBUTION TO THE TRADE. STATE CONNECTION AND TERRITORY, AND OTHER REPRESENTATIONS.

B B

SLOAN'S LINIMENT MADE IN ENGLAND

10/6 CASH BONUS OFFER

FOR A 14 DAYS' WINDOW DISPLAY

To qualify for the Cash Bonus of 10/6 it is only necessary for you to make a

WINDOW DISPLAY OF SLOAN'S LINIMENT

before Nov. 30th, 1932

CLOSING DATE

Oct. 31st, 1932

employing the New Window Cards, and place an order for 6 dozen or 1 gross Sloan's Liniment, **using the Order Form below.**

The display cards should be accompanied with a fairly liberal supply of the goods and occupy a position in the **front** of the window for 14 days.

This is all you are asked to do. The half-guinea will be remitted when you advise us that the display is in operation. **A postcard is enclosed in all display sets for this purpose.**

This offer is limited to ONE BONUS PER CUSTOMER

Reproduction of one of the new season's showcards. Printed in full colour, the cards are suitable for both Window and Counter use. FREE with Bonus Order

1932 CASH BONUS ORDER FORM

BONUS ORDER FORM

Date .....

To Messrs. **WILLIAM R. WARNER & Co. Ltd.** (*Sole Distributors of Sloan's Liniment*)
300 Gray's Inn Road, London, W.C.1.

Please Supply **SLOAN'S LINIMENT**

..... **2/-** size (one original case) at **19/-** per doz. for 6 doz. lots.
..... **2/-** size (two original cases) at **18/-** ,, ,, ,, 1 gross.
..... **4/-** size (two or more original cases) at **38/-** ,, ,, ,, 4 doz. / **36/-** ,, ,, ,, 6 doz.

Original cases only, **2/-** size 6 doz.
4/- size 2 doz.

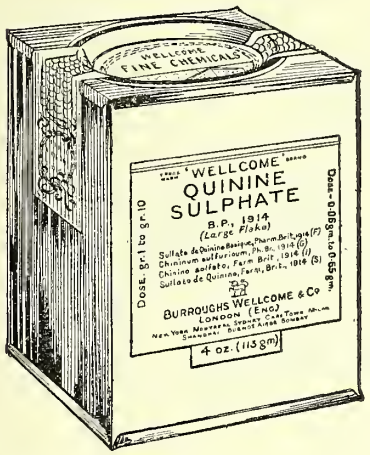
And forward New Season's Window Display Material, which I undertake to display together with goods in my window for 14 days not later than November 30th, 1932, in consideration of the payment of Half-a-Guinea (to be remitted on advice that the display is in operation).

Signed.....

Address .....

.....

Limited to 1 BONUS OFFER



In your Dispensing Department . . . .

Avoid quinine of varying quality and activity by using always

TRADE MARK **'WELLCOME'** BRAND

QUININE

Subjected to exacting tests to ensure purity, pharmaceutical excellence and high therapeutic activity.

Quinine salts issued under the 'Wellcome' Brand are: Bihydrochloride, Bisulphate, Hydrobromide, Hydrochloride, Salicylate, Sulphate, etc.

For full list and prices, see 'Wellcome' Brand Chemicals and Galenicals Price List

For your Retail Counter

TRADE MARK **'TABLOID'** BRAND

QUININE PRODUCTS

Elegant, compressed products containing the precise stated weight of pure, therapeutically active quinine.

Some products which will shortly be in seasonal demand:

TRADE MARK 'TABLOID' BRAND AMMONIATED QUININE
" " QUININE AND CAMPHOR
" " QUININE COMPOUND

For full list, formulæ and prices, see Price List

BURROUGHS WELLCOME & CO., LONDON

G 1688

THE CHEMIST AND DRUGGIST

A Weekly Journal of Pharmacy, the Drug, Chemical and Allied Trades

The official organ of The Pharmaceutical Society of Ireland, The Chemists' and Druggists' Society of Ireland, and of other Chemists' Societies in Overseas Dominions

CONFERENCE NUMBER, 1932

PUBLISHED AT

28 ESSEX STREET, STRAND, LONDON, W.C.2

Telegrams: "Chemicus, Estrand, London" *Telephone: Central 6565 (8 lines)*

BRANCH OFFICES

4 CANNON STREET, MANCHESTER (TEL.: BLACKFRIARS 3052)
19 WATERLOO STREET, GLASGOW (TEL.: CENTRAL 2329)
54 FOSTER'S BUILDINGS, HIGH STREET, SHEFFIELD (TEL.: 22458)
99 QUEEN STREET, MELBOURNE, AUSTRALIA

VOL. 117. NO. 2745 SEPTEMBER 17, 1932

CONTENTS

News of the Week

Key Industry Duty Exemption Order

The Treasury have made an Order under Section 10 (5) of the Finance Act, 1926, exempting amorphous carbon electrodes over three feet long, the cross-section of which exceeds twelve inches both length and breadth, with longitudinal slots exceeding two inches in width and four inches in depth, from liability to duty under Part I of the Safeguarding of Industries Act, 1921. The exemption order came into force on Wednesday, September 7, 1932.

Standing Committee on Wrought Hollow-Ware

The Standing Committee on wrought hollow-ware of iron or steel, self-colour, galvanised, tinned, japanned, etc., has issued its report (Cmd. 4162: Stationery Office, 2d.). The Committee recommends that an Importation Order and a Sale Order should be made, with effect that the following classes of imported goods should bear an indication of origin:—Wrought hollow-ware of iron or steel of a description commonly used for domestic or agricultural purposes, whether self-colour (plain), galvanised, tinned, japanned, painted, lacquered or varnished. It is added that the recommendations should not apply to (*a*) hollow-ware of tinplate, enamelled hollow-ware, or kegs and drums; (*b*) hollow-ware imported as part of another article.

Birmingham

Among the eighty riverside plants on exhibition at the Birmingham Art Gallery are a few of pharmaceutical interest.

The new block of buildings erected in Great Charles Street for a tuberculosis centre, city analyst's laboratory, and city bacteriologist's laboratory will be opened by the Lord Mayor on September 29.

Sheffield

Mr. John Austen, Ph.C., managing director of G. T. W. Newsholme, Ltd., with Mrs. and Miss Austen, is making a motoring tour of Scotland.

One of the leading manufacturing houses has approached the local welfare authorities with a scheme for supplying food to welfare centre patients through chemists by means of a special pack.

At a well-attended meeting of Sheffield panel chemists, held on September 2, Mr. E. Preston (chairman of the Pharmaceutical Committee) explained the proposed new terms for N.H.I. dispensing, and was followed by Mr. C. W. Hobson, member of the N.P.U. Executive. After a full discussion, it was decided to express appreciation of the work of the N.P.U Executive, and the secretary (Mr. Mallinson). While agreeing to the basic figure of 2s. 9¾d., the meeting thought that any surplus arising from this basic figure should be held in trust until the end of the contract period, when any sum remaining after having paid the chemists' accounts in full should be handed to the Ministry of Health. It was also felt to be absolutely essential that Clause 4 (4) should be retained in the new terms.

Miscellaneous

BURGLARY.—Cameras valued at about £50 were stolen from the premises of Kodak, Ltd., Kingsway, London, W.C., early on the morning of September 10.

DENTISTS ACT, 1921.—At Hull, on September 8, George S. Graham, dental mechanic, was fined £100 for practising dentistry without being registered. Previous convictions were proved.

POISON-LICENCE APPLICATIONS.—Application for a licence to sell agricultural and horticultural poisons has been made to the respective local authority by the

following:—Fannie M. Bray and Nicholas Parken (Bray & Parken), Padstow; Trumps, Ltd., Bedford Street, Exeter.

WINDOW-DRESSING AWARD.—At a shopping week window-dressing competition, held recently at Wigton, the first prize in the class for "Things to Use" was awarded to T. Ridley & Son (Chemists), Ltd., King Street.

ALIENS RESTRICTION (AMENDMENT) ACT.—Permission has been granted to Lucian Landau, manufacturer of rubber sponges, 1 Ash Grove, Hackney, London, E.8, to use the name British Rubber Products, and to Arcady Kobylivker, general medical practitioner, 56 Longton Grove, Sydenham, S.E.26, to use the name Koby.

A GUERNSEY ORDINANCE.—An Ordinance which has just been passed in Guernsey affects certain types of commercial travellers. Those calling on firms, wholesale or retail, and offering goods similar to those dealt in by the firm upon which they are calling are not required to have a licence. But if a traveller calls at any private house, office, etc., with samples or catalogues he must take out a licence.

STAFF OUTING.—The annual outing of 300 employees of Scott & Turner, Ltd., Newcastle, took place at Redcar recently. Those present included Mr. Gerald A. France (chairman and managing director) and Mr. Leslie France, his son, who is also a director. Responding to a vote of thanks to the board, Mr. Gerald France said that their trade was regarded as one of the successful lighter industries on Tyneside.

DANGEROUS DRUGS ACTS.—At Marlborough Street Police Court, London, on September 2, Anthea R. Carew was convicted of attempting to procure cocaine for Brenda D. Paul, and of supplying morphine to the same person; on September 9 she was bound over on the first charge, and was fined 1s., with £5 5s. costs, on the second.—At Tower Bridge Police Court, London, on September 5, Brenda D. Paul, charged on remand with being in unlawful possession of 2½ gr. of morphine, was convicted, and was remanded from month to month on bail pending a medical report.—At Harwich, on September 6, John O'Flaherty, Ilford, described as a master mariner, was fined £100 for unlawfully importing and being in possession of 416 gr. of cocaine.

PANEL CHEMISTS DISCUSS TERMS.—At a meeting of Warwickshire panel chemists held at Leamington Spa on September 8, to consider the terms offered by the Ministry of Health for a renewal of their dispensing contracts, Mr. Hutton, who has been chairman of the Pharmaceutical Committee since the inception of the National Health Insurance Act, stated that on his retirement from business he would no longer be able to continue in that office. A resolution expressing the panel chemists' regret at his retirement from the chairmanship, and their due appreciation of his past services, was carried unanimously. In discussing the terms offered for 1933 by the Ministry of Health, it was resolved that the secretary be instructed to convey to the National Pharmaceutical Union Executive the appreciation of Warwickshire panel chemists of their efforts. Great disappointment was expressed at the prospect of Clause 4 (4) being dropped, and it was decided to urge the N.P.U. to continue their opposition, and, if necessary, invoke the assistance of allied bodies.

A CO-OPERATIVE SOCIETY'S VIEW OF PROTECTED GOODS.—The general committee's report presented at the recent quarterly meeting of the Royal Arsenal Co-operative Society at Plumstead stated, *inter alia:* "There are in all eight pharmacy shops at the present time, and efforts are being made to furnish three further establishments before the close of the half-year. . . . Attention is being specially directed to the dispensing of the Society's own special preparations, which can be substituted for those articles upon which there is a condition attached to the sale that no dividend shall be paid thereon. By purchasing Royal Arsenal Co-operative Society's preparations members should understand that in nearly every case where they are comparable to P.A.T.A. packages and remedies the Society's brands are practically the same formulas. They can be guaranteed in every case as to their absolute purity, and at the time of purchase a dividend check can be issued for them. The committee feel that the best way of defeating the Proprietary Articles Traders' Association dividend embargo is that members should render every possible support to the manufacture of their own products."

Scottish Notes

Brevities

Scottish bee-keepers report a particularly good yield of honey this season.

Mountaineering and the study of geology are becoming increasingly popular hobbies among Scottish chemists.

Mr. J. T. Strachan has been appointed Scottish representative for William Tait & Co., chemists' printers, Glasgow.

A complaint that supplies of disinfectants for Banff Academy were obtained from ironmongers and grocers was made recently by Mr. James Hay, chemist, in a letter to the school authority. The matter has been remitted to the local committee.

There was a good turnout for the closing competition of the season of the Edinburgh Chemists' Golf Club, held at Duddingston on September 7. The following were the winners:—(1) M. Stoddart (9) 74; (2) (a tie) W. J. Rosie (11) and J. N. Foote (23) 77. Class II, A. Nicolson, 80. In the final of the T. & H. Smith trophy hole-and-hole tournament, J. Finlay beat W. J. Rosie by one hole.

THE Scottish Chemists' Bowling Association held their last match of the season on Rutherglen Bowling Green, when they competed for the travellers' trophy. There was a fair turnout of wholesale and retail chemists. The competition was so keen that in many instances the last shot won the day. J. C. Murdoch (Glasgow), after playing 27 ends for 21 shots, won the cup and first prize by beating his opponent, J. Davidson (Coatbridge), by three shots. At the close of play the president (P. Nisbet, Leith) presented the cup and prizes to the winners. The prizes were given by Mr. Maclean (Macleans, Ltd., London). The usual votes of thanks brought to a close a pleasant day's outing.

Irish Notes

Brevities

Congratulations have been extended to Mr. J. B. Cronin, L.P.S.I., Rathmore, co. Kerry, as joint owner of a dog which won a stake of £15 recently at Cork in record time.

The Irish Free State Executive Council has made an order authorising the Minister for Finance to allow manufacturers to import, free of duty, any articles liable to duty which are required for manufacturing purposes within the Free State.

Mr. Justice Meredith, of the Dublin High Court, has been appointed chairman of a committee which the Free State Government is setting up to consider the advisability of licensing retail shops, the investigation being regarded as a preliminary to the control of commodity prices. Several public men have been invited to act on the committee.

At the resumed inquest at Dungannon, on September 1, on the body of Wesley Perry, Mr. J. H. Totten, public analyst, Belfast, said he found $\frac{1}{16}$ gr. of strychnine in the intestines. The kidneys and liver contained $\frac{1}{4}$ gr. of strychnine. In one of the bottles received from the police he found Epsom salts. The second bottle received contained $\frac{1}{4}$ oz. of saltpetre, and mixed with the saltpetre was $\frac{1}{3}$ gr. of strychnine. Dr. Mann said death was due to strychnine poisoning. Mrs. Annie Perry, wife of the deceased, said she purchased strychnine in Mr. Grimes's shop in Pomeroy to poison rats. On the day he died her husband drank "salt-

petre," as he had done a few days before. The jury returned an open verdict.

At Dublin District Court, recently, Dr. M. Ryan, L.P.S.I., Camden Street, was summoned for having kept open his chemist's shop after 10 o'clock on the previous Saturday night. Mr. F. Gilligan, solicitor, who represented the defendant, claimed that he was entitled to keep open as he was a medical doctor as well as a chemist, and the shop door was also the entrance to the surgery. Mr. T. F. Burke, solicitor for the Corporation, argued that Dr. Ryan must close his chemist's shop at the same hour as all other chemists. Mr. Little, district justice, said he must hold that the law applied to Dr. Ryan's shop in the same way that it applied to other chemists. However, on contributing 20s. to the Court poor box Dr. Ryan would be given the benefit of the Probation Act.

Belfast

Mr. J. E. Connor, J.P., president of the Pharmaceutical Society of Northern Ireland, Mr. David Kirkpatrick, secretary, and several members of the Council left Belfast on September 9 to attend the meeting of the British Pharmaceutical Conference in Aberdeen.

News has been received in Belfast of the death in New Zealand of Mr. Alex Eccles, of Ladies' Mile, Ramuera, who emigrated from Londonderry many years ago. Mr. Eccles was a director of the New Zealand Chemists' Association and of the Auckland Drug Company.

The annual election to the Council of the Pharmaceutical Society of Northern Ireland takes place on October 3, and a contest seems very probable. Nominations will be received by the secretary of the Society at the Council's offices, Scottish Provident Buildings, Belfast, up to noon on September 19. The pharmacists retiring this year are Messrs. J. E. Connor (president of the Society), John Maxwell, W. J. Hardy and James Dundee, and all are coming forward for re-election. The retiring druggist is Mr. Fred Storey; but as this vacancy is not to be filled owing to the decrease in the number of druggists, Mr. Storey will stand as a pharmacist. Other names are mentioned in pharmaceutical circles.

Coming Events

Saturday, September 17

Grocers' International Exhibition, Royal Agricultural Hall, London, N.1 (and daily to September 23 inclusive). Open 11 a.m.-5 p.m. on September 17 and September 23; 11 a.m.-9 p.m. other days.

Tuesday, September 20

Hairdressing Fair of Fashion, Olympia, London, W.14.

Wednesday, September 21

Manchester Pharmaceutical Golfing Society, Northenden Golf Club. Presentation of prizes.

Topical Reflections

By Xrayser

Leeds Chemists

seem to be giving very serious consideration to the subject of apprenticeship in pharmacy (*C. & D.*, September 10, p. 285), and it is quite right they should do so. One of our most pressing needs is that the period of apprenticeship should be devoted to effective training, and not be regarded as a time to be occupied in doing cheaply what other people ought to be doing at recognised market rates. There ought to be no question nowadays of employing apprentices as a source of cheap labour, the more particularly as there is so much the apprentice needs to learn in order to fit himself for becoming legally qualified, and, more important still, to make himself competent to render satisfactory pharmaceutical service to the British public. The Leeds scheme commends itself by insisting upon the period of apprenticeship extending over an appreciably longer time than is required to satisfy the Pharmaceutical Society's requirements. This is most important when it is recalled that the Society expects that candidates for the Chemist and Druggist Qualifying examination shall have spent the specified 4,000 hours of training in the dispensing and compounding of medicines under supervision. What we need is a scheme of apprenticeship which will provide for complete shop training as a chemist and druggist, and not as a compounder and dispenser of medicines only.

The New Scheme

makes provision for the selection, placing and training of apprentices in chemists' shops, fixes the period of apprenticeship at three or four years, and appears to anticipate all points requiring attention. But in order to make the scheme thoroughly effective there must obviously be in existence a power of inspection by some duly constituted authority, such as the Pharmaceutical Society or one of its branches, and the inspection required would appear to involve subjecting the apprentices to a certain amount of examination or inquisition from time to time. This would, of course, be to the advantage of the master no less than the apprentice, because the latter may be a slacker, and elucidation of that fact by the representative of an authoritative body would be more satisfactory than dependence simply upon a complaint by the master pharmacist. The point is that both the employer and the pupil ought to have a square deal, and that is what one speaker at the recent Leeds meeting said the three years' apprenticeship scheme was going to give them. It is good to know that the scheme is so enthusiastically supported by Leeds chemists, and I shall await news of its further progress with interest.

Transatlantic Conventions

are what we British prefer to call conferences, but they are conferences writ large. According to Mr. Herbert Skinner (p. 284), the recent convention at Toronto was attended by as many as 1,500 persons, which I should imagine is something like three times as many as ever attend the biggest gathering of pharmacists and their friends at the British Pharmaceutical Conference. What strikes me more forcibly, however, is the number of sectional meetings at the Toronto convention, and the fact that the papers submitted for consideration, which numbered more than 100, were presented without discussion. It suggests itself to me that adoption of this plan might provide a way out of the difficulty experienced in making adequate provision for meetings at the British Pharmaceutical Conference. Discussion of the papers presented is often more or less perfunctory, and I venture to suggest that it may be well worth adopting presentation without discussion, the more especially as adequate criticisms based on more leisurely consideration of the papers would always find space in the pharmaceutical Press. It may be objected that such a change would involve a tremendous break away from tradition, but is it not a fact that the reading of papers is frequently followed by an auditory of a dozen or fewer, while many of the most capable critics are often unable to attend the annual gatherings, so that their comments are perforce reserved until later and then can only appear in print?

New Companies

and Company News

P.C. means Private Company and R.O. Registered Office.

BLAKOE APPLIANCES, LTD. (P.C.).—Capital £100. Objects: To carry on business as manufacturers of and dealers in medical and surgical apparatus, etc.

MARSONS, LTD. (P.C.).—Capital £1,200. Objects: To carry on the business of chemists, druggists, opticians, etc. R.O.: 123 Baker Street, London, W.1.

DAVID WILLOX, LTD. (P.C.).—Capital £2,000. Objects: To carry on the business of chemical manufacturers and drysalters, etc. R.O.: 50 Quarry Knowe, Glasgow.

GRIFFITHS (CHEMISTS), LTD. (P.C.).—Capital £1,000. Objects: To acquire the business of a wholesale and retail chemist and druggist now carried on by H. N. Griffiths at Middlesbrough.

SHOOSMITH-KINGSLEY, LTD. (P.C.).—Capital £2,500. Objects: To carry on the business of manufacturers and merchants of chemicals and drugs, perfume and other products, etc. Secretary: L. W. Glyde, 56 Ludgate Hill, E.C.

'YN PRODUCTS, LTD. (P.C.).—Capital £500. Objects: To carry on the business of manufacturing chemists, manufacturers of, agents for, and dealers in dental, surgical and hygienic products, etc. R.O.: Woodside, 85 Wimborne Road, Bournemouth.

J. ROBINSON & SONS (BRADFORD), LTD. (P.C.).—Capital £3,000. Objects: To acquire the business now carried on by J. Robinson and W. Robinson as "Jas. Robinson & Sons" at 83 Barkerend Road, Bradford, and to carry on the business of medical herbalists, skin specialists, druggists, manufacturing and dispensing chemists, etc.

VINCE LABORATORY, LTD. (P.C.).—Capital £500. Objects: To acquire the trade mark and goodwill of the business in the United Kingdom formerly owned by Vince Laboratories Incorporated, and to carry on the business of manufacturers of and dealers in toilet, pharmaceutical and medicinal preparations, etc. Solicitors: McKenna & Co., 31-4 Basinghall Street, E.C.2.

DEODIS (PROPRIETARIES), LTD. (P.C.).—Capital £6,000. Objects: To adopt agreements (1) with the liquidator of Deodis Products, Ltd., and (2) with R. V. Davies, and (3) with P. A. Arnold, and to carry on the business of chemical manufacturers, druggists, drug grinders, chemists, sundriesmen, makers of and dealers in proprietary articles, etc. Solicitors: Denton Hall & Burgin, 3 Gray's Inn Road, W.C.1.

PICKUPS, LTD. (P.C.).—Capital £30,000. Objects: To carry on the business of chemists, druggists, drysalters, oil and colour men, manufacturers of and dealers in pharmaceuticals, perfumes, toilet requisites, soap, patent medicines, etc., and to adopt an agreement between Harry Pickup, sen., and Harry Pickup, jun., of the one part and Commercial Constructions, Ltd., of the other part. R.O.: 28 Lincoln's Inn Fields, W.C.2.

Gazette

Bankruptcy Acts

ADJUDICATION

JONES, C. F., 104 Selborne Road, Southgate, Middlesex, manufacturing chemist.

RECEIVING ORDER AND ADJUDICATION

BURDEN, S., "Alberta," New Road, Aston Clinton, Bucks, and lately carrying on business at The Old Drewery Pharmacy, Breen End Street, Aston Clinton, chemist.

Insurance Act Dispensing

Record of matters concerning Chemists' interests in the National Health Insurance Acts.

Local Reports

ENGLAND AND WALES

London. — The annual report of the Pharmaceutical Committee of the County of London contains, *inter alia*, the following table of dispensing statistics for the County of London for the years 1927-31:—

Year	Number of prescriptions	Mean number of insured persons	Average number of prescriptions per insured person	Average cost per insured person
1927 ..	8,743,249	1,778,563	4.92	40.16d.
1928 ..	8,437,809	1,810,025	4.66	37.60d.
1929 ..	8,940,870	1,839,161	4.85	38.48d.
1930 ..	8,129,038	1,886,169	4.31	32.89d.
1931 ..	8,510,255	1,904,521	4.47	34.09d.

Merthyr Tydfil.—At a recent meeting of the Insurance Committee, the Pharmaceutical Service Subcommittee reported that they had considered a case in which a chemist had dispensed a preparation which the doctor had not ordered. It appeared from what the chemist stated that he knew from previous experience what the doctor required. The doctor appeared before the subcommittee in support of the chemist and stated that he undertook full responsibility for what had happened, and that the chemist, before dispensing the first prescription, had telephoned him on the matter. The subcommittee accepted the explanation.

Staffordshire.—At a recent meeting of the Staffordshire Insurance Committee consideration was given to a case in which certain prescriptions had been dispensed by an unqualified person. The Pharmaceutical Service Subcommittee had made a recommendation to the Committee that the Minister of Health be advised to withhold £50 payment. It was stated that the superintendent chemist was away from business through ill-health from April 23 up to and including June 8. During the period of his absence no qualified person was employed. During the month of May 167 Insurance prescriptions were dispensed, ninety-three of which contained scheduled poisons. The bulk of these prescriptions were dispensed by the managing director, who was not a qualified person. Those facts were not disputed. In his evidence the managing director stated that he was unable to obtain the services of a locum, and that he was expecting his manager to return daily. Occasionally he had the help of a qualified chemist.

Warwick.—At a recent meeting of the Warwickshire Insurance Committee the report of the Medical Benefit Subcommittee contained a request by a doctor that he should be paid for a specified proprietary medicine supplied or to be supplied to a patient. He stated that this proprietary medicine had a marked antiseptic value and was a sedative, both of which effects he required for this case. The following resolution was carried unanimously:—"That the action of the Medical Benefit Committee in authorising application to the Ministry for sanction to pay for the proprietary medicine referred to, and subject to such sanction directing that the cost be borne by the Insurance Committee, be and is hereby approved and confirmed."

SCOTLAND

Dundee.—At a meeting of the Insurance Committee on July 20, a successful appeal to the Department of Health by Mr. A. T. Reoch, a Dundee chemist, was reported. It was stated that some time ago the Pharmaceutical Service Subcommittee recommended that the appellant be surcharged the sum of 21s. in respect of a test prescription, but that the Department had sustained his appeal and found the Committee liable to him in the sum of 21s. as modified expenses.

Pharmaceutical Society of Northern Ireland

Council Meeting

A SPECIAL meeting of the Council of the Pharmaceutical Society of Northern Ireland was held in Belfast on September 9, the president (Mr. J. E. Connor) in the chair. There were present also Messrs. R. I. Edwards (vice-president), A. C. McBride, Fred Storey, H. Todd, John Maxwell, S. Gibson, W. Martin, James Dundee, S. H. Forrest, J. C. Culbert, W. J. Hardy, Sir Thomas McMullan, Dr. Fielden and Mr. W. S. Taylor. Mr. David Kirkpatrick (secretary) was in attendance.

THE NEW BRITISH PHARMACOPŒIA

Mr. STOREY drew attention to the fact that in England the Pharmaceutical Society had decided to use the new B.P. in the summer examinations.

The PRESIDENT said that the new B.P. would come into force at their Society's July examinations and after.

DEATH

The secretary reported the death of Mr. Samuel Suffern, one of the first members of the Council.

The PRESIDENT moved a vote of condolence with the relatives, stating that pharmacy had lost one of its best and truest members. Mr. Suffern gave of his best to the Society.

Mr. STOREY, in seconding, said he had known Mr. Suffern for many years. He was a staunch member of the Chemists' and Druggists' Society and of the old Society in Dublin, and also of the Advisory Committee which assisted the Northern Government in drawing up the Pharmacy Bill. He had a wonderful knowledge of their Acts, and was a keen literary student.

Mr. GIBSON said Mr. Suffern had a legal mind, and was able to grasp difficult points. On several occasions he went to London in connection with pharmacy legislation and had interviewed members of the Government.

Mr. CULBERT, Mr. HARDY, Mr. EDWARDS and Mr. DUNDEE also paid tribute to Mr. Suffern. The resolution was passed by a standing vote.

METHYLATED SPIRIT LICENCES

A member wrote asking that the Society should take in hand the obtaining of methylated spirit licences for the members and charge a small fee.

Mr. STOREY and the SECRETARY said this was rather outside the Society's work.

The PRESIDENT remarked that it was more a matter for the Ulster Retail Drug Trade Association.

Mr. HARDY said it had been already before that body and notice would be given at the proper time.

The PRESIDENT said that co-operation on a matter of the kind was advisable, and it would be very acceptable to the country members to know that a solicitor could be engaged. Any action had better be taken by the trade organisations.

FINANCIAL STATEMENT

Mr. TODD (treasurer) submitted the financial statement, which showed a balance in hand on the year's working of £1,265. The Society's investments amounted to £8,630.

On the motion of Mr. STOREY, seconded by Mr. HARDY, it was ordered that the report be printed and circulated.

ANNUAL MEETING

The annual meeting of the Society was fixed for 7.30 p.m. on October 3 in the Chamber of Commerce.

Mr. CULBERT asked if the meeting could be held in the afternoon to give the country members a chance of attending.

Mr. EDWARDS said the election count would occupy the earlier part of the day, and Mr. DUNDEE suggested Londonderry as the venue of the meeting. The Council adhered to 7.30 p.m. on October 3 in Belfast.

MEMBERS ELECTED

The following nominated candidates were elected members of the Society:—Arthur Lothian Pollock, 18 Cherryvalley Gardens, Belfast; William John Paul Linehan, 42 Earlswood Road, Belfast; David James Rowe, 73 Woodhouse Street, Portadown; Robert Blair, c/o J. Mortimer & Co., Londonderry; Frances Elizabeth Irwin, 5 Campsie Avenue, Omagh.

In reply to Mr. Culbert, the SECRETARY said these six members would not be eligible to vote at the forthcoming election.

The New Pharmacopœia

By Observer

FROM whatever standpoint one looks at the publication of the new British Pharmacopœia, it is of vital importance to the drug trade. The retail, wholesale and manufacturing chemists must use it as the pivot from which most of their trade and interests spring. To the members of the medical profession it is of much less importance, so much so that large numbers of them do not even know of the publication of a new Pharmacopœia. If the medical fraternity do not find it so necessary and important as the chemists, then some arrangements should be made whereby a chemist can have certain facilities which so far have been denied him.

The General Medical Council is entrusted by statute to print and publish the Pharmacopœia. Prior to publication chemists can, as an act of courtesy, see a copy in the offices of the General Medical Council, either in London, Edinburgh or Dublin. Let us consider the cost to the provincial wholesale druggist of sending one or two people to London for three or four days to go through the new B.P. in order to obtain the necessary data for manufacturing and testing purposes. A clerk cannot be sent; it must be a skilled technician who knows exactly the requirements of the house, as well as one having a thorough knowledge of the old B.P. A question bound to come to the minds of all chemists is whether or not the British Pharmacopœia is a Government publication. Surely the General Medical Council is acting in the capacity of a Government department, in so far as it is carrying out Government work. Under such circumstances it is not to be wondered at that the Government fixes the price at which the Pharmacopœia shall be sold, just as in the case of other Government publications. With other Government publications, however, copies are sent to technical papers with a request that the publication shall be reviewed in their columns.

A Financial Point

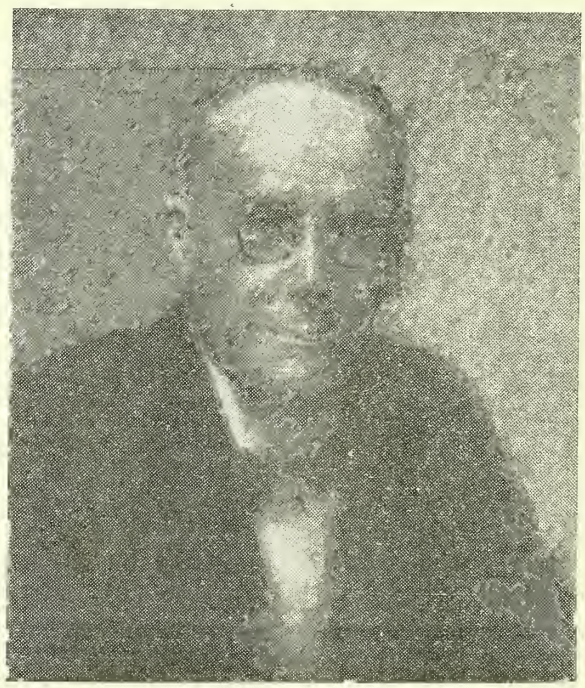
One other serious cause for complaint is that the General Medical Council, which relies very largely upon the gratuitous work of chemists in the compilation of the Pharmacopœia, takes the profits which accrue from its publication and sale. These profits appear to be used for General Medical Council purposes entirely. It is time we had legisation to deal with this question. The Board of Trade and the Privy Council must realise the difficulties that are placed in the way of all those connected with the drug and chemical trade. If the interest of the General Medical Council is purely financial, it is time that interest either went to the Pharmaceutical Society or, perhaps better still, to the Privy Council. In the next parliamentary session there may be a suitable opportunity for the Privy Council to introduce legislation which would bring the compilation and publication of the Pharmacopœia directly under the control of that department. The present editor, Dr. C. H. Hampshire, could not be improved upon as permanent editor of the Pharmacopœia. This would bring the profits of the sale of a Government publication to the nation and at the same time enable those who have to be prepared to supply the goods to have the necessary knowledge.

BRITISH PHARMACEUTICAL CONFERENCE

The Chairman's Address

HOSPITAL PHARMACEUTICAL SERVICE

THE first time a practising pharmaceutist in hospital service has been privileged to give the address as chairman of the British Pharmaceutical Conference is obviously a fitting occasion to expect a message conveying impressions gained in connection with this phase of pharmacy. Hospital service in pharmaceutics is often neglected or taken for granted as something that happens. Legislative organisation, apart from Northern Ireland, does not exist, and hundreds of local and lay authorities interpret the service in various ways without any basic principles for guidance. Some recognition of status arose as a side-issue out of the Regulations made under the Dangerous Drugs Act, 1920, but that was due to the impossibility of working under the Regulations made for keeping open shop. This department of a hospital in Great Britain is largely the growth of the last fifty years. Before that time, and in isolated cases continuing to the present day, the departments were places where prescriptions were dispensed on lines of mass production, and the person who did the work was called "the dispenser." This name, with its limiting connotation, still sticks in the lay and even the medical mind, and frequently obscures the true function of the pharmaceutist in charge. Even the famous Departmental Committee was mentally fogged about poisons and dispensing and compounding of medicaments, and being unable to say what pharmacy was, confined itself to a pious platitude, while the House of Lords missed the conception completely, and discreetly retired behind a smoke screen created by a medical committee from which pharmacists were excluded.



MR. HERBERT SKINNER, PH.C.
CHAIRMAN OF THE BRITISH PHARMACEUTICAL CONFERENCE, 1932

The Scope of Pharmacy

I have stated elsewhere (and it bears restating): if our idea of pharmacy is limited to our ability to dispense medicines and act as custodians of potent drugs, then our whole structure of education is too exacting and wrongly conceived. It is like constructing an efficient machine and trusting to circumstance to find use for it. The deadening effect of this mental obsession that a bottle of medicine is our objective should be removed; then the true functioning of the pharmacist will be understood and appreciated. Medical diagnosis and surgical treatment is more exacting and efficient, and that alone requires a response from pharmacists with a wider basic training. If the art of pharmacy is to prepare medicines, then it must be granted that the hospital pharmacist has his fill. The last returns from seventeen London hospitals show within the year 114,533 new in-patients and 944,481 out-patients, who made 4,860,210 attendances. But it must not be thought that the service rendered to them was confined to compounding medicine. It is more important to remember the diverse ways of treatment and find out to what extent pharmacists functioned in this service.

Functions of the Hospital Pharmaceutist

The new British Pharmacopœia reveals clearly the functions of the hospital pharmaceutist. For the first time that book represents an effort towards a complete expression of medication worthy of official recognition. Improvements in treatment have hitherto been unorganised, often overlapping and mostly emanating from external establishments and clinics. Our changing materia medica, based upon a deeper understanding of biological functioning, requires a wider outlook by the Pharmaceutical Society, or at least something better than that preamble to the 1868 Pharmacy Act. The Society can lead in furnishing its graduates with training to fulfil the obligations arising from biological research. A pharmacological laboratory loses most of its attractions for pharmacists unless some training in its functioning is included in the curriculum, graduate or post-graduate as circumstance dictates. Dr. Burn, in his "Recent Advances in Materia Medica," has a few pertinent remarks which reveal the need of the pharmacist to acquire a wider training and knowledge if he is to practise his profession. He states:—

"The book is . . . written for pharmacists in the first place, but it should be equally useful to medical practitioners. Since elementary physiology remains outside the curriculum of many schools of pharmacy, in one or two chapters there are physiological digressions . . . . On the other hand the book fails of its object in so far as any part of it is not clear to a pharmacist who has had no systematic training in physiology."

"In view of the importance of sera, hormones and vitamins, insufficient attention is paid to them in teaching of

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pharmacology to medical students; it is still common to find text-books in which long chapters are devoted to the action of drugs on the central nervous system, but one or two paragraphs to sera and vitamins. If, however, some redressing of the balance is required in medical instruction, there is scarcely a balance to be redressed in the teaching of pharmacists, for the newer knowledge finds almost no place at all in many schools."

Dr. Burn might have gone further and said: "The teaching of the principles of pharmacology to pharmacists is practically non-existent." Yet the hospital pharmaceutist is required in many institutions to give lectures to the nursing staff for their State examinations on materia medica and therapeutics; and, at present, unless he continues his studies after graduation, he will not be able properly to fulfil that function. To explain drugs it is necessary, as far as possible, to understand their action and uses.

The Laboratory

While the pharmaceutist must possess the technique of the smaller phase of a manufacturing laboratory for teaching purposes, he must be able to adapt himself to a technique midway between that of the manufacturer and that of the experimentalist—in other words, he must develop a technique fitting to hospital requirements. The term "dispensing" tends to obscure the laboratory on which it depends. Nothing is more important than the cultivation of the laboratory phase, and that applies equally to shops. The disappearance of the laboratory, wherever it occurs, converts the pharmacist largely into a distributor rather than a technician. It is undoubtedly a question of economics; and successive governments do not help us much with their system of deferred rebates and records required. It would be interesting to know how much of our money the Government holds in suspense from this medicine business; whatever the amount is, it certainly affects very deeply the economics of conducting hospital laboratories. It always appears to me that the pharmacist who closes down his laboratory is losing the soul of pharmacy—a loss that is much too serious to be made good by profits on proprietary and packed goods. The growth of biological research for medical treatment will require more and not less laboratory practice. The importance of a profession is not measured by the amount of knowledge stored up in recesses of memory, but in practical application of the knowledge to useful purpose, which makes the laboratory a necessary condition to ensure progress. Another phase arises from the preparation of solutions and sterilisation whether for medical, surgical or diagnostic purposes. Let us visualise what it means. A hundred gallons of normal saline solution is used to-day where one was used twenty years ago, and in those days intravenous diagnostic solutions were almost unknown. It is only necessary for pharmacists to consider the appendices of the new British Pharmacopœia to get some idea of the scope of medical and surgical expectation; we must remember that for the first time in this country these matters become official. What we see there is just a small fraction of the total of the divergent and expanding needs of surgeon, physician and radiologist.

The Economic Aspect

The economic position in voluntary hospitals conditions many of our activities. It is interesting to note that the term "voluntary," like the term "dispenser," has largely lost its meaning. Whatever the cost, the best is the only reasonable proposition; for cheap pharmacy is like most things cheap—we are better without it. The purchase of surgical instruments, medical appliances and sutures is in the hands of the pharmaceutist in a large number of institutions, but this phase is like shelling peas in comparison with other activities, and the knowledge necessary can easily be obtained from an elementary understanding of anatomy, physiology and mechanics.

A Minister of Health may specify in Regulations under the National Health Insurance Act that surgical dressings shall be packed, sterilised and sealed in suitable containers of suitable sizes for distribution to insured persons. That does not help the hospital pharmaceutist save in a few small details. He is required to be able to differentiate the good from the bad or indifferent and mixed material. He is required to estimate and check the respective antiseptics used, to understand the changing effects on materials often introduced by sterilisation of surgical dressings on the large scale, and to be an authority on the respective values. I am quite confident I shall have the assent of the chairman of the Surgical Dressings Committee of the British Pharmaceutical Codex when I venture to say the problem of surgical dressings is not quite so easy as it looks. The Codex now in preparation should be a help in the future, as it will make available more accurate information and save us from dependence on isolated and often contradictory opinions. It should make for real progress in this phase of pharmacy.

The Hospital Pharmacopœia

Compounding of medicaments must be admitted to be an important phase of hospital pharmacy; it was neither the beginning nor will it be the end, but the pharmaceutist is required to be skilled in constructing formulas to produce the best therapeutic effects, often from somewhat scanty information. The exigencies of the medical service make it a desirable thing, in this respect, that he should be of material assistance to the physician and surgeon. If the tendency to bank on known, admitted and approved compounds is too marked, it gives opportunity to the novelty merchant to "put across" his elegant variations. Thus, quietly, for years we practised blending hypnotics with antipyretics to accentuate the hypnotic effect, and left it to external clinics to exploit the idea as a novelty. Our formulas for ointments of known dermatological value are often tried out in foreign clinics, and return to us disguised under a meaningless branded name, much to our detriment. There is a real danger of getting into a rut, which the comparatively safe economic position in the public service has a tendency to encourage. Pharmaceutically speaking, we lose the essence of things if we forget that the price of progress is eternal vigilance. The production of an efficient hospital pharmacopœia is our job. The physician indicates his requirements, and the pharmaceutist blends the medicaments into efficient therapeutic agents.

The Analytical Department

The analytical department is obviously an annex of the laboratory; but looking back I fear we have not always been able to render 100 per cent. service owing to the lack of appreciation that the work was a natural corollary of pharmaceutical training. In that training, however, something has always been missing, namely, a specific distinction signifying analytical competence. The recent vacation course at Bloomsbury Square included lectures on: Modern methods of diagnosis; recent advances in determining the efficiency of antiseptics; biological tests; sterilisation; vitamins. Apparently, the Pharmaceutical Council has begun to appreciate the fact that its present syllabus is not all-embracing for the pharmaceutist. The new departure shows a broader outlook for pharmacy, while indicating a more competent relationship with medical diagnosis and treatment quite apart from dispensing of prescriptions; and I venture to suggest that the needs of the hospital pharmaceutist in training are not unconnected with this wider survey of functions. There is not an element in that series on which he has not been expected to acquire knowledge and put it to practical use; and the sources of information have seldom been organised. He is not only the analyst for drugs, but for foods also, disinfectants too, and in many cases certain pathological substances included

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in what is now termed biological analysis. In other words he is, not infrequently, the only chemist on the hospital staff. While, therefore, we welcome the recognition of the necessity of advanced instruction and knowledge for the general or shopkeeping pharmacist, we claim that hospital pharmaceutists are fully competent to collaborate in any scheme of educational reform.

Associated Departments

In 1921 proposals for rationalising the hospital service of this country were submitted to the Minister of Health by a special committee. The need for economy prevented further progress. Some minor but unsuitable assistant phase was suggested for the pharmacist—utterly inadequate for the recognition of his knowledge and training. Since then Public Assistance authorities have supplanted the old Poor Law authorities, and in some centres laboratories for biological analysis have been organised out of public funds. Recently an advertisement from one of these institutions required a pharmacist with pathological experience, but it was doubtful whether it meant what it said. At the Bath Conference in 1924 the chairman, the late Edmund White, basing his remarks on this report to rationalise hospital service, said, "There is a sort of no man's land between medicine and pharmacy, and the question arises whether we by our training are rendering ourselves worthy to occupy that no man's land to be useful to the physician and the community." Later he said, "We must earn the right to participate," and he claimed the right to participate. The Pharmaceutical Society established a Pharmacological Laboratory, and later added a nutrition department.

Dr. Burn, the director, under my own presidency at Brighton, read a paper at the delegates' meeting on this subject and cognate matters, such as the adaptation of pharmaceutical training to changed conditions, and set forth a new orientation based on the advance in biological knowledge. For many years many hospital pharmaceutists have set themselves the task of being useful under these changing conditions, conscious that the base of pharmacy must be broadened unless more vocations for sectional help in medical treatment were to be created and pharmacy sink to a lower plane. Pioneers have not found it easy, since training did not exist—and if it did, without a diploma attached, confidence in ability to perform would be difficult to create, and the opportunity might easily pass never to return. Pharmacy—and I use the term in its widest sense of medical service—is an independent entity in practice and a necessary help not only to the physician, the surgeon, the radiologist, pathologist and bacteriologist, but to any, at present unthought-of, phase of remedial agency where service can be rendered to assist the practitioner. Pharmacy is an expanding, adaptable science of usefulness, or it is played out. I prefer to think the Pharmaceutical Council is alive to the need of equipping its graduates for this wider sphere of usefulness.

Newer Materia Medica

I would like to speak on another phase. One of the most trying features in the life of the hospital pharmaceutist is not the introduction of new medicaments, which is comparatively easy, but the variants of the same medicament which spring up like mushrooms in artificial surroundings. Brand names for known substances are frequently misleading, and cause unnecessary duplication of stock and waste of money. The original conception of the British Pharmaceutical Codex was to subdue these variations to a standard wherever possible. It has not been completely successful, though it has succeeded to a much greater degree than might have been anticipated when we recall the storm of opposition with which the first Codex was received because it challenged the brand-name abuse. Many trivial names which were specially coined for the Codex are now in common use, and in several instances pharmacists will note with satisfaction that the British Pharmacopœia, 1932, has bodily lifted and made official certain medicaments to which, hitherto, it was necessary to add the letters "B.P.C." Here let me pay a tribute to hospital physicians, whom we pharmaceutists should greatly appreciate. I have never found anyone yet who would not preferably order a B.P.C. medicament or pharmaceutical preparation rather than a branded article, always providing the pharmaceutist can present a satisfactory case for its therapeutic equivalence. The British Pharmaceutical Codex was originally a compendium of medicines without emphasising standards. As one who knows something of the former revision, and that now proceeding, I think I can safely say the new Codex will set a standard which will be valuable to the hospital physician and general practitioner—and that means to the welfare of the community. A pharmacopœia largely conditions the practice of pharmacy; and if we add the Codex we might also add efficient medication. Many things are put forward for therapeutic use which would carry greater confidence if there was attached to them the opinion of an independent pharmaceutical or pharmacological authority. In a few instances the Pharmacological Laboratory of the Pharmaceutical Society has published results in the Quarterly Journal, but every hospital man whose opinion is sought knows the great need for comparing pharmacological tests with clinical observations. We should then better understand where we were, in the case of many old drugs as well as new.

The Pharmacist and the Clinician

The final test for any drug is clinical usefulness. If one reads extracts from clinical literature there is a risk of being bewildered. A study of the statements there made, drawn from a variety of sources, places one in danger of accumulating a wonderful mass of useless knowledge. It is probably asking too much of the comprehensive profession of medicine to be wise on all points in the possible clinical use of drugs, but there is no reason on earth why the pharmacist should not be an intelligent link between the pharmacological expert and the clinician, and not leave it all to the so-called medical representative or traveller. That only reiterates what I have been saying. The pharmaceutist requires a broader foundational training. To make a *précis* of case papers is a simple clerical job; but to understand their value and place them where they might be reproductive of beneficial results requires understanding and a nice discrimination between essentials and non-essentials. Hundreds of pamphlets pass through the hands of the hospital pharmaceutist yearly. If he is wise he studies them critically and makes notes, for one never realises the ramifications of the modern medical representative. The mass of unsifted statements made verbally as well as in print can become exceedingly costly to the hospital and conceivably harmful, unless the pharmaceutist is able to sift the wheat from the chaff. It is a pharmaceutical job to know and understand materia medica—and I use the term in its widest possible sense.

Pharmacy and Research

Dr. Burn said at the Brighton meeting of delegates that "at the present time pharmacy is suffering eclipse from the inefficiency of the British Pharmacopœia, 1914." Let us hope the eclipse will soon become a relic of the past. To what extent we shall be better off with the British Pharmacopœia, 1932, rests largely with ourselves and no one else. What we in hospitals need is that adequate and continuous work should be undertaken to produce a pharmacopœia and ensure co-operation between the physician, pharmacologist and pharmaceutist, to consider and report on every prospective medicament or diagnostic agent within more reasonable periods. Advance in medical treatment depends in a considerable measure on the liveliness in pharmaceutical activity. The final decision whether any medicament

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should be made official can easily await the result of experience at the prospective decennial revision. My business to-day is not to expound the British Pharmacopœia, but specific research due to the demand for quick publication is bad. Unless we can stimulate the urge to continued research, we shall fail to justify the claim of organised pharmacists to further consideration. There should be no break in the continuity of research required for future revision of the British Pharmacopœia and the Codex.

At Manchester the suggestion was put forward to reconstitute a Conference research list. That list will be before you in the annual report. Looking on this phase of pharmacy from the hospital point of view, I am conscious that we have scattered throughout our pharmaceutical departments a mass of experiences which could not fail to be valuable if we were able to collect, sift and give them more public and useful expression. Problems arise daily; some are solved, and, strange to say, sometimes forgotten only to be rediscovered later on by someone who proceeds to make money out of the rediscovery. In the United States I had several discussions on this subject, about the efforts made to stimulate the urge for research among competent pharmaceutists and to correlate the results. The Pharmacy Department of the Columbia University, as you are doubtless aware, periodically sends over here a student with a scholarship to our School of Pharmacy for research, the objective being his thesis for the Ph.D. What seems to me desirable in pharmacy is that research might have a more useful therapeutic objective. The purpose of pharmacy is to make more effective for the use of the physician materia medica in its widest interpretation. New remedies are very important to the hospital pharmacist, as you may have already gathered from my observations. We have our "Quarterly Journal of Pharmacy and Pharmacology," we have various attempts at therapeutic indexes, and we have the summary of advances in chemistry, pharmacognosy, pharmacology, pharmacy, new medicaments, and even problems in dispensing, collected within our "Year-Book of Pharmacy"; and yet all these, to me, leave something to be desired.

Unacceptable Introductions

The American method differs from ours; they have an annual volume called "New and Unofficial Remedies," where many things are, so to speak, on trial. I am greatly interested in the expressions of opinion in the official medical journal when a remedy is rejected. The professed object is "to protect the medical profession and the public against fraud, undesirable secrecy and objectionable advertising in connection with proprietary medicinal articles." It sounds interesting, and from my inquiries it serves a very useful purpose with a composite population like that of the United States. It does one good to read in the "Journal of the American Medical Association" that a preparation is unacceptable in "New and Unofficial Remedies" "because it is a preparation of indefinite composition offered with unwarranted claims under a proprietary name which is non-descriptive of its composition." Or, a statement of this character on a claim that a new mixture obviates certain gastric disturbances from iodine and salicylates:—

"There is no reason to believe that the several components of this mixture will mitigate in any way the characteristics of salicylic acid when administered in the form of sodium salicylate. On the contrary, the ingredients are a hindrance to the intelligent use of salicylates."

Or, on a so-called diabetic remedy:—

"The article is unacceptable because its composition is indefinite, because no evidence is offered that it possesses any therapeutic value or that its potency is demonstrated or controlled, because it is sold under a therapeutically suggestive name which is non-informative of the composition of the product, with unwarranted claims in such a way as to lead the public to place false dependence on it in a disease, the management of which requires the supervision of a physician."

None of these things was accepted for "New and Unofficial Remedies," yet I am credibly informed that one, at least, is not unknown on this side of the Atlantic. There is now a method introduced into Great Britain by the Medical Research Council last year: several medical specialists act as a Therapeutic Trials Committee working in harmony with the Chemotherapy Committee to examine new products submitted to them commercially for controlled clinical tests. We have here the beginnings of better things, and hospital men appreciate the possibilities. If the committee can eliminate those weird things that come from all parts of the globe, that "have their day and cease to be," and not infrequently interfere with some known remedial agents because they have not behind them an apostle of truth in advertising, then it will be a boon and a blessing. It should not be beyond the wit of the professional societies of medicine and pharmacy to devise some regulative mechanism capable of dealing with this never-ending stream of remedies based on detached opinions and insufficient data.

Conclusion

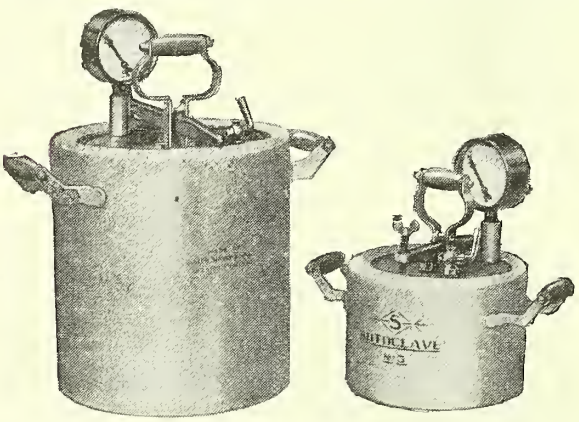
To a certain extent it may appear that I have outlined a change in outlook. If it is change, it has been one of slow growth, and rightly so, since sudden and forced change is less likely to have permanent value. In hospitals we think pharmacy can supply, and is supplying, a more satisfying service than is officially recognised. That is my justification to-day for what I have said. If we think more realistically about pharmacy we shall find it plays a practical and useful part in modern therapeutics. Above all, the status of a profession depends upon the ability of its practitioners to make good, and for that they must be trained. The only safe way to usefulness is to broaden the base of pharmaceutical training, to create a wider service; then more adequate recognition of our profession will follow as surely as day follows night. The reasonable expectation of the community from our profession is the services we can render in the restoration and maintenance of individual as well as public health.

SCOTCH FIDDLE.

Please Dockthar to gee me a Bauber's worth o'Brimstane— its no for mysel but for anither Gentleman thats outsyde.

Trade Notes

A NEW AUTOCLAVE.—We have received from Britton, Malcolm & Waymark, Ltd., 38 Southwark Bridge Road, London, S.E.1, details of a new autoclave for pharmacists. The apparatus, which is manufactured by Joseph Sankey & Sons, Ltd., Bilston, is designed to meet the requirements of the British Pharmacopœia, 1932, and the needs of modern dispensing practice. The smaller of the two models, illustrated herewith, has a sterilising chamber of about 7½ in. in diameter, and 5 in. deep. The larger has a sterilising chamber 10 ins. in dia-



meter and 10½ in. deep. The container is made of pressed steel, which is tested to withstand a pressure of 100 lb. per square inch. The lid is fitted with a washer and is placed beneath the rim, a crossbar and thumbscrew form an effective means of closure. The lid is fitted with a safety valve and pressure gauge; the latter, of the automatic gas-regulating type, is graduated in degrees C. and lbs. per square inch pressure. The apparatus contains galvanised iron wire cages and a wire grid. The prices of both sizes are well within the reach of the average chemist, the larger model, on account of its greater capacity, being, of course, the more useful.

A NEW bakelite container (and holder) for H.B.T. aseptic shaving soap is advertised by Mr. Hunter Beattie, Monteith Row, Glasgow, S.E.

WOODEN CHIP BOXES are advertised in this issue by Mr. Jos Klein, Kaiserswalde, Kr. Habelschwerdt, Bez. Breslau, Germany. Sample and prices on application.

THE merits of Askit powders are emphasised by Askit, Ltd., Keppochill Road, Glasgow, who point out that this proprietary has been nationally advertised for twenty-five years.

LITTLE VICTOR INHALER.—Particulars of the Little Victor inhaler (vest-pocket model), including display terms, are given by Cockburn & Co., Ltd., 130-140 Howard Street, Glasgow.

A DESIGN in bed-pans has been registered by Shelley Potteries, Ltd., Longton, embodying various features designed to increase comfort in use. Particulars will be found elsewhere in this issue.

ZIM.—Under the name of Zim, Arthur H. Cox & Co., Ltd., Brighton, are introducing four articles—inhalant, toothache tincture, corn cure, vapourstick—retailing at a popular price, and allowing a good margin of profit.

PREMO BATH BRUSHES. — We are asked by Premo Brushes, Ltd., Petersfield, to explain that the retail price of the "club" size (extra large) Premo bath brushes advertised in our issue of September 10, is 2s. 6d., not as printed.

ULTRA-VIOLET RAY LAMP.—A. Brodersen, 11 Northampton Square, London, E.C.1, have marketed a lamp for the production of ultra-violet rays in the household. The lamp is known as the Stella Vita, and is issued at a moderate price.

CALENDARS.—Dudley & Co., Ltd., 451 Holloway Road, London, N.7, have sent us specimens of pictorial calendars for next year. These show a good variety of subject, colouring and general style, and are quoted in quantities from fifty upwards.

PREPARATIONS FOR THE FEET.—C. L. Shard & Co., Ltd., 212-214 Great Portland Street, London, W.1, call attention to Marchers Oxygenated Footbath Salts and Foot Dusting Powder, retailing at a popular price and sent, with show material, on advantageous terms.

PAMPHLET ON DOMESTIC PESTS.—The Rodent and Insect Pest Destruction Co., Ltd., 69A Sancroft Street, London, S.E.11, has issued a thirty-two page illustrated pamphlet (6d., post free) on the control and destruction of domestic pests, including rodents and insects.

ACCORDING TO THE NEW PHARMACOPŒIA.—Products conforming to the requirements of the British Pharmacopœia, 1932, are offered by William Ransom & Son, Ltd., Hitchin; and by National Drug Industries, Ltd., Devon Wharf, Emmott Street, Mile End, London, E.1.

AN antiseptic (perfumed) known as Deodis is advertised widely and regularly. Particulars are given elsewhere. The distributors for England and Wales are Francis Newbery & Sons, Ltd., 31-33 Banner Street, London, E.C.1; and for Scotland James Taylor (Trongate), Ltd., 132 Trongate, Glasgow, C.1.

PERMENDA.—Phillip's Patents, Ltd., 142 Old Street, London, E.C.1, are marketing a new product for "ladders" and small holes in silk stockings. This product, it is stated, can be applied so as to prevent the formation of "ladders" or to repair those that may have formed. Particulars will be found in the advertisement pages of this issue.

NOVEL PRESENTATION.—M. J. Fecher, Ltd., Cuckoo House, 10 Dod Street, London, E.14, give details, on another page of this issue, of their refillable iodine pencil, guaranteed unleakable and smartly finished. Another novelty from the same house is the Fingertip menthol cone, flattened obliquely on one side to imitate the shape of a finger point and attractively cased in bakelite.

ANTISEPTIKOL is the name of a tooth-paste distributed by J. C. Gambles & Co., Ltd., 211-215 Blackfriars Road, London, S.E.1. It is claimed that this is a straightforward, pleasant, cleansing and refreshing dentifrice attractively packed and sent out without extravagant claims. The showcard supplied is original and distinctive in a very attractive way.

SHAVING WITHOUT RAZOR.—"Snow" is the name of a new powder used for making a shaving lather which is taken off by means of a wooden spatula supplied (with shaving brush) with each packet. The analysis forwarded to us shows the presence of calcium sulphate and carbonate, silica and strontium sulphide as the principal ingredients. No poisonous metal is present. The product is marketed by The Britannia Laboratories, 13 Little Titchfield Street, London, W.1, whose bonus offer appears in the advertisement pages of this issue.

Births

Notices for insertion in this column must be properly authenticated.

RUSHTON.—At 26 Stainburn Road, Moortown, Leeds, on September 8, the wife of H. Rushton (*née* Nora Eaddie, of a son.

SPENCE.—At 3 Cressbourne Avenue, Roker, on September 9, Elsie, wife of John Spence, M.P.S., of a son.

SPENCER PALMER.—At 1 Carnarvon Buildings, High Street, Clacton-on-Sea, on September 8, Andrée (*née* Edwards), M.P.S., wife of R. L. Spencer Palmer, M.P.S., of a daughter.

Marriages

CLAYSON—TREEN.—At St. Peter's Church, Dunchurch, Warwickshire, on September 12, William M. Clayson, Ph.C., to Dorothy L. Treen, Dunchurch.

ROBSON—BRYSON.—At St. George's Church, Gateshead, on September 1, by the Rev. J. W. Swift, M.A., William Robson, chemist and druggist, Low Fell, Gateshead, to Hilda Bryson, chemist and druggist, Gateshead.

STATHER—MARSDEN.—At Oughtibridge Church, on September 8, William Eric Stather, M.P.S., eldest son of Mr. W. B. Stather, M.P.S., "Leigh Wold," Upperthorpe, Sheffield, to Margaret Marsden, Westbourne, Oughtibridge.

Deaths

NICHOLSON.—At 27 Beaver Road, Didsbury, recently, after a brief illness, Mr. Malcolm Nicholson, chemist and druggist, for many years manager to Boots, Ltd., at the Oldham Street, Manchester, branch.

WHERLY.—At the Liverpool Royal Infirmary, on September 7, following a seizure, Mr. Charles Wherly, chemist and druggist, Rake Lane, Wallasey, aged fifty-nine. Mr. Wherly opened a shop in Wallasey in 1899. He retired a few years ago from active participation in the business, which has since been carried on by his nephew. Mr. Wherly was a member of the Liverpool Chemists' Association and of the Wallasey Pharmacists' Association.

WHITEHEAD.—In Farfield Nursing Home, Morecambe, on September 2, Mr. Frederick Nathaniel Whitehead, Ph.C., 2 Queen Street, aged sixty-three. Mr. Whitehead, who was a native of Manchester, commenced business on his own account at Carshalton, but purchased the pharmacy of Mr. J. J. Fell, Ph.C., Morecambe, in 1896, and successfully developed it. He was a past-president of the Lancaster and District Chemists' Association. For many years Mr. Whitehead was organist of Morecambe Parish Church, and he was one of the earliest workers in connection with the Morecambe Musical Festival. He was also a member of the Morecambe Golf Club and a prominent freemason. He is survived by a widow and daughter. The funeral took place on September 6, and was preceded by a service at the Parish Church, attended by the Mayor, several members of the Corporation, magistrates and others. Mr. Alexander Bate represented the Lancaster Kendal and District Branch of the Pharmaceutical Society, and Mr. J. B. Shattock the Lancaster Branch of the National Pharmaceutical Union. Among the numerous floral tributes were wreaths from the County Pharmaceutical Committee, the Lancaster Branch of the Pharmaceutical Society, and fellow chemists in Morecambe and the district.

Personalities

MR. T. J. BADGETT, Clarence Place, Newport, Mon., a past-president of the Newport and Monmouthshire Branch of the Pharmaceutical Society, has been appointed chairman of the Newport Insurance Committee.

SIR FREDERICK KEEBLE, F.R.S., has been released from executive and routine duties as controller of the agricultural research station of Imperial Chemical Industries, Ltd., in order that he may be able to devote himself more freely to scientific problems in connection with agriculture. Sir Frederick remains a member of the Imperial Chemical Industries Research Council.

MR. JOHN H. ROBINSON, Exchange Station Pharmacy, Liverpool, happily recovered from his alarming experience when a heavy van crashed into his window recently, gave the returning British delegates from the Canadian-American Pharmaceutical Convention a pleasant surprise by welcoming them on their arrival from Montreal on September 6.

MR. JAMES R. RUST, Lord Provost of Aberdeen, whose portrait appears on p. 320 of this issue, is managing director of Charles McDonald, Ltd., Froghall Granite Works. His lordship has a record of public work extending over about twenty-five years. After serving for a time as a city councillor for the Rosemount Ward he was appointed civic treasurer; and in this capacity was so successful that he was elected to the highest office in the city in due course. The Lord Provost is now in this third year of office. In addition to his responsible duties in municipal affairs he is chairman of the Harbour Trust and serves on other public bodies.

Business Changes

MR. HENRY WEIR, Ph.C., has opened a pharmacy at 7 Ormeau Road, Belfast.

MR. R. MACKENNA, Ph.C., has commenced business at 62 Botanic Avenue, Belfast.

MR. A. E. AXTELL, chemist and druggist, is shortly opening a branch at Kidlington.

THE name of Feen-a-mint Products, Ltd., Bush House, London, W.C.2, has been changed to White's Laboratories, Ltd.

MR. C. G. HATCHARD, chemist and druggist, has purchased the Camden Pharmacy from Spedding & Hurst, High Street, Peckham, London, S.E.15.

A PHARMACY has been opened at 129C Upper Newtownards Road, Belfast, under the style of the Oakland Pharmacy, Ltd., under the management of Mr. John R. Sanderson, Ph.C.

Wills

MR. THOMAS WILSON, 52 Park Road, Lenton, Nottingham, chemist and druggist, who died on February 12 last, aged eighty-one, left estate gross value £21,558, with net personalty £10,784.

MR. WILLIAM ORR, Ph.C., Hartford Cottage, The Mall, Armagh, co. Armagh, merchant, who died on November 2 last, left personal estate in Great Britain and Northern Ireland valued at £7,139.

ALDERMAN STEPHEN STEPHENS, J.P., 136 Longwood Road, Huddersfield, Yorks, chemist and druggist, a member of the Huddersfield Town Council, who died on April 20 last, aged seventy-five, left estate value £4,059, with net personalty £2,541.

Information Department

INFORMATION WANTED

Postal or telephone information with respect to makers or first-hand suppliers of the undermentioned articles will be appreciated.

C/149. Castle medal edible glue
B/149. Happy Days teething necklaces
H/79. Kalle (tropical foot powder)
E/149. Lime and milk (for chilblains)
G/129. My Beauty razor
W/109. Ozolin perfumery products
E/149. Quinalgin tablets
E/149. Ung. Sebane

THE
CHEMIST AND DRUGGIST
VOL. CXVII. SEPTEMBER 17, 1932 NO. 2745

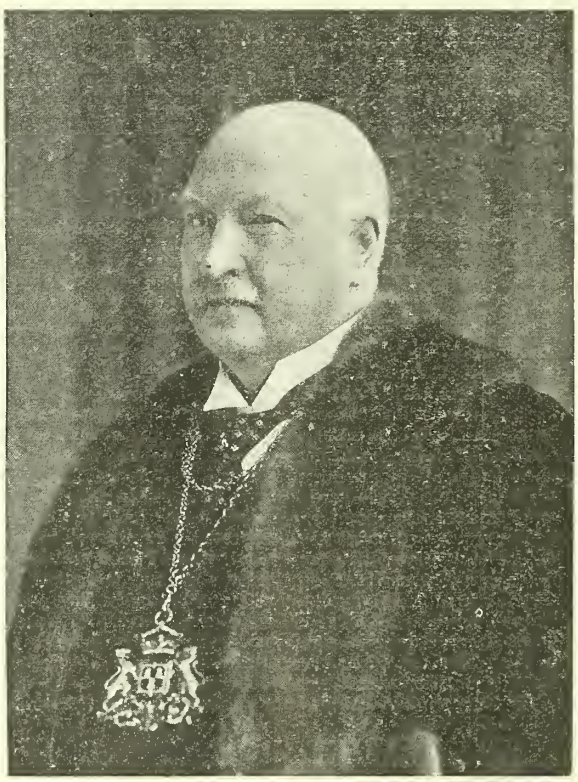
The Conference Papers

THE Aberdeen meeting of the British Pharmaceutical Conference, which had not concluded when we went to press, has been distinguished by an attendance above the average of recent years and by the Highland welcome accorded to members and visitors from other districts. The address of the chairman (Mr. Herbert Skinner) was in effect an eloquent plea for a true conception of pharmacy. "It always appears to me," the chairman remarked in one passage, "that the pharmacist who closes down his laboratory is losing the soul of pharmacy—a loss that is much too serious to be made good by profits on proprietary and packed goods." The papers presented in the Science Section numbered twenty-nine, the highest figure on record, as far as we are aware. *The Analytical Classification of the Fish-Liver Oils* has been explored by Messrs. Norman Evers and Wilfred Smith, who compare oils obtained from (1) fish of the *Gadidæ* family; (2) the elasmobranch class of fish; (3) miscellaneous fish. The general analytical characters are tabulated. Messrs. Noel L. Allport and T. Tusting Cocking have improved the process for *The Colorimetric Assay of Ergot* in the 1932 B.P., the addition of ferric chloride obviating any need for the exposure to light previously necessary for colour development. Messrs. P. A. W. Self and C. E. Corfield have devised new methods for *The Determination of Colchicine in Colchicum Corm and Seeds and the Official Colchicum Preparations*, finding the methods of previous investigators to be defective. *Some Proposed New Formulas for the British Pharmaceutical Codex*, arranged with comments by Mr. H. Treves Brown, will be read with interest, especially in view of the newly established relation between the British Pharmacopœia and the Codex. Mr. James Coutts has investigated *The Assay of Santonin in Artemisia* by various methods, and has devised a new gravimetric process. Miss E. M. Smelt has carried out *A Comparison of Tests for Balsam of Peru*, selecting seventeen specimens for examination. The results obtained are tabulated. Mr. F. Wokes makes *A Comparison of the Antidiuretic and Oxytocic Potencies of Commercial Pituitary Extracts*, and deals with methods of assay. The same author shows, in *The Protein Content of Commercial Pituitary Extract*, that undue increase in the content indicates inefficiency in manufacture through loss of activity. *The Volumetric Assay of Chlorates* is examined by Mr. G. J. W. Ferrey, who in two contributions shows that the reaction between chloric and hydriodic acids is rapid and assay accurate provided the conditions laid down are followed. *Strong Solution of Lead Subacetate* is not an equilibrium mixture, but a variable solution, according to phase-rule reasonings by Mr. C. Morton. *The Origins of British Pharmacy* are the subject of an interesting survey by Mr. J. P. Gilmour, who makes a strong appeal for the compilation of "a comprehensive and standard work" on the subject, and suggests that the Conference might encourage the study of the history of pharmacy. Mr. H. Brindle discusses *The Volumetric Determination of Mercuric Chloride by Rupp's Method* and its drawbacks. He suggests shortening the time required for dissolving the precipitated mercury in the iodine by adding a given quantity of a mixture of ether and chloroform in the proportions of two to one by volume. A paper which is of considerable importance in connection with the testing of dispensing is that on *The Determination of Mercury in Mixtures containing Solutions of Mercuric Chloride and Vegetable Infusions*, by Miss L. M. Mundy and Miss C. W. S. Rix. Messrs. N. Glass and A. J. Jones discuss *The Preparation and Composition of the Precipitated Phosphates of Calcium*, and conclude that almost any proportion of di- and tribasic phosphate may occur in a sample according to the conditions of manufacture. Messrs. A. D. Powell and G. F. Hall discuss the difficulties of *The Estimation of Lead and Other Metals in Iron Salts*, and suggest a new test. The application to pharmaceutical preparations of the test which Mr. Norman Evers and Mr. L. A. Haddock recently described for the determination of minute amounts of copper is the subject of a paper by these workers entitled *The Copper Content of Certain Pharmaceutical Preparations and Chemicals*. The importance of traces of copper in iron medicaments has led to new methods by Messrs. Noel L. Allport and G. H. Skrimshire for *The Determination of Traces of Lead and Copper in Iron Preparations*. Mr. David Rattray points out that there exists in the pharmacist's mind certain impressions as to the nature and inherent qualities of effervescent preparations, notably as regards their hygroscopic nature, and consequent liability to premature chemical reaction. It was to elicit a numerical foundation for such impressions that he has undertaken the research described in *Effervescent Properties of Granular Effervescent Preparations*. A derivative of phenylethaneolamine has been synthetised by Messrs. H. E. Glynn and W. H. Linnell, whose paper is entitled *Halogen Analogues of Adrenalin and Ephedrine*, in an attempt to find a stable substance with the pharmacological action of adrenalin. *The Preparation of Certain Aliphatic Amino-Alcohols* is discussed by Messrs. H. E. Glynn and W. H. Linnell as part of a study of the structure of anæsthetics. Benzoic esters of amino-alcohols containing five and six carbon atoms respectively are devoid of local anæsthetic action, and it is surmised that this is due to increase in length of carbon chain between the functional hydroxy and amino groups. *The Phenol Content of Some Nasal Antiseptic Tablets and Phenol Lozenges* is sadly deficient, as shown by the research of Mr. C. E. Corfield and Miss L. Marjorie Mundy on the determination of phenol in medicaments. *The Determination of Phenol in Phenol Ointment* has been studied by Miss E. M. Smelt, with the result that either of two methods is recommended. Messrs. C. T. Bennett and N. R. Campbell contribute a paper on *The Determination of Bismuth in Solution of Bismuth and Ammonium Citrate*. In a *Note on Calcium Glycerophosphate* Messrs. C. T. Bennett and N. R. Campbell arrive at the conclusion that only the neutral salt should be used for the B.P. Codex compound syrup of glycerophosphates. Analytical data are given. A new apparatus for *The Estimation of Essential Oil in Drugs and Spices* is described by Messrs. T. T. Cocking and G. Middleton. An improved formula for *Mistura Bismuthi Composita Acida cum Pepsino, B.P.C.*, is the outcome of the paper by Mr. C. J. Eastland. In *A Classification of Some Recent Biological Methods*, Dr. J. H. Burn gives a conspectus of principles of biological standardisation. Finally, Mr. S. Taylor contributes a *Note on the Colouring Matter of Cochineal*, using as his starting point the so-called gelatinisation of solutions of cochineal. The author recommends the extraction of the colour by using first a weak acid and afterwards a weak alkaline solution. Meetings of delegates from the Society's branches have also been held, and the social events, as our reports indicate, have proved highly attractive.

BRITISH PHARMACEUTICAL CONFERENCE

The Proceedings

ABERDEEN has been the home of the British Pharmaceutical Conference on two previous occasions, in 1885 and in 1908. At the earlier of these meetings the president was Mr. J. B. Stephenson, a Scottish pharmacist who had a university training under Professor William Gregory and Sir Robert Christison at Edinburgh, and was chairman of the Pharmaceutical Society's Scottish Board of Examiners for several years. The vice-presidents included Mr. Michael Carteighe (then president of the Pharmaceutical Society), Mr. F. Baden Benger (Manchester) and Mr. J. P. Kay (Aberdeen). The treasurer was Mr. Charles Umney; the general secretaries were Mr. Sidney Plowman, F.R.C.S., and Dr. J. C. Thresh; and the local secretary was Mr. A. Strachan. The papers presented numbered twenty-five; a few of the authors are still engaged in scientific research, even if they are not present at this year's meeting. They included (in order of appearance) Sir Wyndham Dunstan and Mr. F. Ransom (two joint monographs on the assay of belladonna leaves), Mr. W. Gilmour, Mr. Peter MacEwan (afterwards Editor of THE CHEMIST AND DRUGGIST, who presented an analysis of various eucalyptus oils), Mr. D. B. Dott, Mr. Thomas Maben, Mr. A. H. Allen, Mr. W. A. H. Naylor (afterwards a president of the Conference), Dr. David Hooper (president of the Conference in 1916), and Mr. Robert Wright (president of the Conference at the next Aberdeen meeting). Our report of the Conference mentions that at the first session about seventy members were present; the attendance book eventually showed a total of about twice that number. Several visits to local works and other places of interest were organised; and after the more serious proceedings had been formally closed an all-day excursion to Braemar took place. This was a much-appreciated function, as also was the annual dinner of the Aberdeen and North of Scotland Society of Chemists and Druggists, to which members of the Conference were invited. The "Year-Book of Pharmacy" afterwards recorded that "the list of toasts was too long to admit of more than a very condensed report"; apparently other publications experienced the same difficulty, as "after the usual loyal and patriotic toasts" (the number of which is not stated) had been honoured twelve others were given. Among the members and visitors were Messrs. Coutts, Giles, Paterson, Sim and Strachan, of Aberdeen; Mr. Payne, of Belfast; Messrs. Alcock and Barclay (afterwards Sir Thomas Barclay), of Birmingham; Mr. Savage, of Brighton; Messrs. Anderson, Ferrier and Kerr, of Dundee; Mr. Howie, then of Eccles; Messrs. Dott, Gilmour and Pinkerton, of Edinburgh; Messrs. Frazer and Kinninmont, of Glasgow; Mr. Ward, of Leeds; Messrs. Burford and St. Dalmas, of Leicester; Messrs. T. F. Abraham and Conroy, of Liverpool; a strong contingent from London, including Messrs. Bremridge, R. H. Davies, W. Martindale, Passmore, R. A. (afterwards Sir Richard) Robinson, C. and J. C. Umney, J. Williams and A. C. Wootton (Editor of THE CHEMIST AND DRUGGIST); Messrs. J. Angell and A. H. Jackson, of Manchester; Mr. Allen, of Sheffield; and Mr. Groves, of Weymouth.



THE LORD PROVOST OF ABERDEEN
(MR. JAMES R. RUST)

At the 1908 Aberdeen meeting of the Conference the proceedings assumed the order that, with slight variation in detail, is still usual. A civic reception in the Art Gallery on the eve of the opening was the occasion of some brief and excellent speeches. The late Mr. Robert Wright, of Buxton, was the president; the vice-presidents included at least three who may be present again this year if circumstances permit — Professor Greenish and Messrs. Naylor and Ransom; the treasurer was Mr. J. C. Umney; the general secretaries were Messrs. E. Saville Peck and E. White; and the local secretary was Mr. W. F. Hay (now chairman of the Local Executive Committee). The Science Section received twenty-three papers; among the contributors were Mr. T. Maltby Clague, Mr. F. H. Alcock, Dr. David Hooper, Mr. Harold Wyatt, Mr. W. B. Cowie, Mr. B. M. Brander (afterwards assistant editor of THE CHEMIST AND DRUGGIST), Mr. Gilbert Simpson, Mr. J. P. Gilmour, Dr. W. E. Dixon (jointly with Mr. W. H. Harvey), Dr. F. B. Power (with Mr. H. Rogerson), Mr. Ernest Quant, Mr. E. W. Pollard and (with Mr. H. E. Watt) Mr. (afterwards Lieutenant-Colonel) E. F. Harrison. The Conference was welcomed at the opening session by the Vice-Chancellor and Principal of Aberdeen University (the Very Rev. Dr. J. Marshall Lang), who was the father of the present Archbishop of Canterbury. As in 1885, the numerous excursions culminated in an all-day outing to Braemar. Our "Who Were There" column included many names that reappear in the corresponding list from the present meeting.

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Opening Session

Tuesday, September 13

Glorious weather greeted the members and visitors on rising on Tuesday morning, and the MacRobert Hall of Robert Gordon's Colleges was well filled when the chairman of the Conference (Mr. Herbert Skinner) took the chair. He was supported by, among others, Messrs. Hines, Keall, Rowsell, Franklin, Tocher, Peck, R. R. Bennett, Gamble, D. Lloyd Howard, Melhuish, Dr. Hampshire and Dr. Crossley Holland.

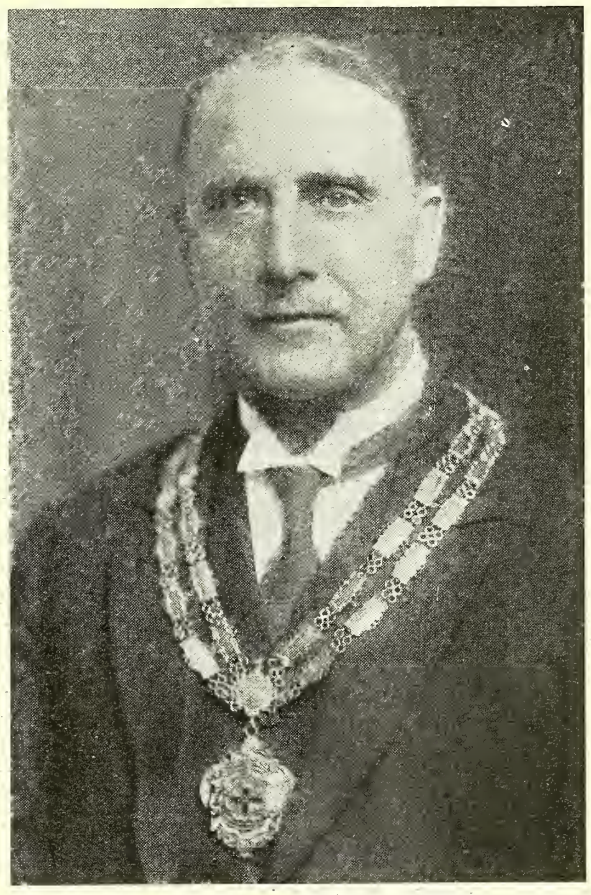
The CHAIRMAN called on Bailie Swinney to address the Conference.

THE CIVIC WELCOME

BAILIE W. DIXON SWINNEY (who was wearing his crimson robe and gold chain of office) said: "Deputising for Lord Provost Rust, who much regrets his inability to be present to greet you here this morning, owing to pressing civic duties, I have great pleasure, on behalf of the Lord Provost, magistrates, Council and citizens of Aberdeen, in extending to you a most cordial welcome to our city. (Applause.) We consider it an honour that such a learned scientific body should be holding its Conference in our midst so far north. Many people who do not know Scotland well are under the mistaken impression that civilisation stops short at Edinburgh —(laughter)—and they are greatly and agreeably surprised on venturing further north to find a modern, progressive, well-equipped city, with a charm and beauty of its own, due largely, perhaps, to the material from which it is built—("Hear, hear" and applause)—catering not only for the physical well-being of its citizens, but possessing a University whose record and traditions pass far down the centuries, and whose sons occupy prominent positions all over the world. (Aplause.) So, although I grant you that Edinburgh may be regarded as the heart of Scotland, may I venture the suggestion that Aberdeen may have a claim to the head. (Applause.) I trust, therefore, that the bracing atmosphere of our city and the natural beauty of its surroundings may prove conducive to a full measure of success attending the efforts of your Conference. (Applause.)

It is but natural and fitting that Aberdeen should take a special interest in your proceedings, because I find that the oldest pharmaceutical organisation in Britain was the Aberdeen Pharmaceutical Association, founded in 1839—(Applause)—so that, if my arithmetic is correct, that is thirty-four years before your Conference began its activities. (Applause.) So we, in Aberdeen, if we cannot claim to be the parent of the British Pharmaceutical Conference, may be permitted the privilege of the relationship of elder brother. (Applause.) Your duties as pharmacists are intimately bound up with the great science and art of healing, and you are a valuable—nay, I should rather say, an essential and indispensable—adjunct to the medical profession and the great institutions for the relief of the sick and the suffering. By your labours you are performing a national service in securing that the fruits of the research laboratories are made available to the public in a form that makes possible the successful treatment of diseases that were formerly baffling to medical science. You have established for yourselves a great reputation, and have deservedly won the confidence of the medical profession and the general public. There was a time not so very long ago—before the passing of the Insurance Acts — when the skilful chemist stood in the position of guide, philosopher and friend to many a working-class household. (Applause.) The position has now changed with the operation of Health Insurance, but it seems to me, as a friend of mine remarked the other day, the skilful chemist has now re-established the same relationship with the middle classes.

Now, ladies and gentlemen, I know from your agenda that you have many matters of vital interest to discuss, and I shall not, therefore, longer detain you from the business for which you are met. I trust your discussions and deliberations here will result in further benefit to the community, and add still greater lustre to the name of the British Pharmaceutical Conference. (Loud applause.)



MR. F. GLADSTONE HINES

PRESIDENT OF THE PHARMACEUTICAL SOCIETY OF GREAT BRITAIN

THE PRESIDENT'S REPLY

MR. F. GLADSTONE HINES (president of the Pharmaceutical Society): It is for me this morning, on your behalf as a Conference, and on behalf of the Society, to thank Bailie Swinney for the very kind welcome he has afforded to us to this City of Aberdeen. (Applause.) Whenever we woke up we realised that it was an invigorating morning, and that we were to experience the invigorating breezes of Aberdeen, and had received a hearty welcome to the city in which the Conference is so greatly appreciated. (Applause.) We are here, doubtless, for serious business, for the Conference has to do with two things. In the first place our Conference is the culminating point of the year, and the presentation of that amount of scientific research which has been done to provide not only an increasing amount of knowledge in pharmaceutical affairs, but to improve the processes and methods of manufacture, all of which go for the benefit of the community itself. (Applause.) That is the serious side. But there is also the social side with its social reunions.

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(Applause.) We are a peripatetic body, and like all peripatetic bodies, we widen our circle of friendships from year to year in all parts of the British Isles. We have been at Manchester, Cardiff, Brighton, and now we are in the Far North, because we think there are considerable numbers in the City of Aberdeen who should be with us—(Applause)—and we hope to have a good time in exploring the beauties of this part of Scotland. (Applause.) We are looking forward to making acquaintance with beautiful Deeside, and shall appreciate the opportunity of knowing better this City of Aberdeen. (Applause.)

Chairman's Address

The chairman then delivered his address, which is printed in full on pp. 312-15 of this issue.

Vote of Thanks

Mr. E. Saville Peck moved a vote of thanks to the chairman. Mr. Peck said he could not help feeling a distinct wish to bring to the notice of members that twenty-four years ago Robert Wright was chairman of the Conference, and he fulfilled the desire which had been expressed by the present chairman, who had been most happy in the choice of his subject. Mr. Skinner was the greatest authority on hospital pharmacy. He had treated his subject in a most skilful manner. (Applause.) A great number of hospital pharmacists could teach the medical man to appreciate more the thing he ordered. (Applause, and laughter.) Mr. Peck said he was delighted that Mr. Skinner finished up on the note of optimism, because he was of opinion that the pharmacist, properly trained, would ultimately reap adequate remuneration. (Applause.)

Mr. J. H. Franklin, in seconding the vote of thanks, said it gave him very great pleasure to do so. It was the first time they had an address on hospital pharmacy, and with the present evolution of medicine it was the most appropriate address they could have had. (Applause.) Never in the history of the world had pharmacy reached such a high efficiency as at the present time in the laboratories, thanks to medical research and the assistance of pharmacists in the hospitals. And if the importance of hospital pharmacy was recognised, it might draw attention to the claims of the hospital pharmacists. (Applause.) The Conference must do all it can for this advance in hospital pharmacy, because there must be advance, and it must, in large measure, emanate from those pharmacy dispensaries which are usually attached to modern hospitals. (Applause.) In modern hospitals the treatment was vastly different from what it was twenty-five to thirty years ago—and of that they would get some rather startling examples in the British Pharmacopœia. He thought they might very well offer their thanks to the hospital pharmacists of the country for the very valuable work they were doing. (Applause.) They might say the hospital pharmacist was a success, and hope he would continue to promote the general health of the country. (Applause.)

The Chairman of the Conference, in acknowledging the vote of thanks, said: I would like to emphasise that hospitals have the name of being extremely useful for helping pharmacists, and I think they are in a better condition than ever with regard to the treatment of diseases and relieving many of those troubles that afflict humanity. Thear are quite a number of hospital pharmacists here to-day, and I am glad to think they have chosen a chairman from their own ranks. (Applause.) We should be conscious we have the beginning of a better development than our own in being attached to institutions of the country. What has been done in the past has been small in comparison to what we will be able to do. (Applause.) If we are united more conscientiously with our fellows in the hospital service—or let me say, rather, in the medical science—we can secure advances in that service and bring the hospital to a position of greater efficiency.

Science Section

Tuesday Morning

The opening meeting of the Science Session commenced at 11.30 on Tuesday morning, the chair being occupied by the chairman of the Conference, Mr. Herbert Skinner, who first called upon Mr. Norman Evers to read a paper on:—

The Analytical Classification of the Fish-Liver Oils

By Norman Evers, B.Sc., F.I.C., and Wilfred Smith, B.Sc., A.I.C.

[Abstract]

The fish from which liver oils are extracted commercially may be divided into three groups:—(1) The fish of the *Gadidæ* family including the cod, coal-fish, haddock, ling, torsk, etc.; (2) the elasmobranch class of fish, including the sharks, dog-fish, and skate; (3) a few miscellaneous fish such as the hake and the halibut. The oil may be readily extracted from the livers of the members of the first two groups by a simple process of heating with water. This distinguishes them from most other fish, from which only small amounts of oil can be obtained by this method. The object of the authors' investigation was to determine how far differences in analytical characters and particularly in the nature of the unsaponifiable matter correspond with the zoological classification.

The Composition and Characters of the Unsaponifiable Matter

The method of Bolton and Williams ("Analyst," 1932, 57, 25) for the determination of unsaponifiable matter has been used in this paper. Bolton and Williams stress the importance of using ether rather than light petroleum when fish or fish-liver oils are being tested. The authors found that the difference in the results obtained with the two solvents was particularly evident with shark-liver oils. (A table is given.) If the unsaponifiable matter be re-saponified with alcoholic potash, state the authors, it can then be completely extracted with light petroleum without any difficulty.

The authors then give the more important constituents of the unsaponifiable matter of fish-liver oils and a summary of the mort important investigations on cod-liver oil, shark-liver oil, dog-fish liver oil, and halibut-liver oil.

The bulk of the cholesterol may be crystallised from the unsaponifiable matter by dissolving in about ten volumes of absolute methyl alcohol and allowing to stand for twenty-four hours at 0° C. After removal of the cholesterol by filtration at 0° C. the methyl alcohol may be evaporated off and on dissolving the residue in about ten volumes of acetone, any insoluble matter being filtered off, and allowing to stand at 0° C. for twenty-four hours butyl alcohol if present in any quantity crystallises out. A number of oils were treated in this way, the composition of the crystals being checked by means of the melting-point and recrystallisation being carried out, if this varied by much from that of the pure substance. The crystals so obtained were weighed. (A table is given.)

From the table it appears that the oils may roughly group themselves according to their zoological classification. These results suggested the possibility of obtaining quantitative analytical figures on the unsaponifiable matter which would show these variations in composition. The acetyl value appeared to be a likely figure, but it was found that there was great difficulty in obtaining accurate results on small quantities of unsaponifiable matter and the method was abandoned.

The iodine values of the unsaponifiable matter were obtained on the series of oils which the authors examined and are reported. (A table is given.) The oils of the *Gadidæ* family give definitely higher iodine

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values than any of the other oils. This would not apply, however, to those shark-liver oils containing large amounts of squalene.

The following are the details of the method used for the preparation of the acid phthalic esters (results are tabulated):—

0.5 gm. of the unsaponifiable matter was dissolved in 5 c.c. of pyridine in a conical flask and to the solution 1.1 gm. of phthalic anhydride was added. After standing in the dark for from three to four days 15 c.c. of water and an excess of peroxide-free ether were added. After washing with 20 c.c. of 2 per cent. sulphuric acid to remove the pyridine, the ether layer was washed with water until the washings were neutral. This necessitates as many as twenty washings in most cases. The ether layer was dried over anhydrous sodium sulphate, filtered into a weighed flask, the ether evaporated and the residue dried in the steam-oven to constant weight. The residue was dissolved in a small quantity of ether (about 2 c.c.) and a large excess (250 c.c.) of light petroleum was added and the whole allowed to stand overnight at a temperature of about 10° C. The precipitate was filtered off and well washed with light petroleum and the filtrate and washings were collected in a weighed flask. After evaporating the mixed solvents the residue was dried in the oven to constant weight. This gave the light petroleum soluble matter, while the difference between this and the total esterfied material gives the light petroleum-insoluble esters.

General Analytical Characters

The figures given in Tables I (III) and II (IV) were determined on oils extracted from the livers of fish caught in the North Sea or North Atlantic, being authenticated specimens made from livers unmixed with the livers of other fish. The figures given for cod-liver oil show the variation in the results obtained with samples of pure cod-liver oil extending over the last few years; those for unsaponifiable matter include only those which have been obtained since the authors have been satisfied that the method of determination gave the whole of the unsaponifiable matter in the oil.

Table I [III]
Cod-liver Oils

	No. examined	Mean value	Limits	B.P. 1932 limits
Sp. gr. 15.5/15.5°	40	0.9262	0.924–0.929	0.922–0.929
Ref. ind. 40° ..	32	1.4711	1.4705–1.4728	1.4705–1.4745
Acid value ..	87	0.65	0.20–1.50	not more than 1.2
Saponification value	42	184.7	181–189	180–190
Iodine value ..	46	162.5	154–172	155–173
Unsaponifiable matter	27	1.17	0.93–1.52	not more than 1.5 per cent.
"Blue" value ..	63	13.5	4.6–24.6	not less than 6.0

Concluding, the authors state that from these results the strong resemblance between the oils of the *Gadidæ* family is apparent, although none of these oils except cod complies with the B.P. 1932 requirements in every particular. Among the elasmobranch fish the sharks and dog-fish give oils having a close resemblance to one another in having low s. g., saponification and iodine values and in containing high percentages of unsaponifiable matter. These oils are readily distinguishable from the *Gadidæ* oils by analysis. Skate-liver oil, on the other hand, is markedly different from the shark and dog-fish liver oils and its analytical constants resemble those of the *Gadidæ*. The unsaponifiable matter, however, is different in character. Hake oil again is indistinguishable from the oils of the *Gadidæ* except by an examination of the unsaponifiable matter. Halibut-liver oil is remarkable for its high "blue value," which is, however, variable in different specimens of the oil. The solvent-extracted oil contains a high proportion of unsaponifiable matter.

Summary

(1) The composition of the unsaponifiable matter of a number of fish liver oils has been examined especially from the point of view of the content of cholesterol and butyl alcohol.

(2) A quantitative method, based on the separation of the acid phthalic esters of cholesterol and the dihydric aliphatic alcohols by means of their solubilities in petroleum ether, has been applied to these oils.

(3) The iodine values of the unsaponifiable matter of the oils has been determined.

(4) The results show a variation in the composition of the unsaponifiable matter according to the zoological classification of the fish. The iodine value of the unsaponifiable matter combined with the acid phthalic ester value determined by the method described should prove useful in determining the type of fish from which an unknown oil has been obtained.

(5) The usual analytical values for these oils are given.

This work was carried out in the laboratories of Allen & Hanburys, Ltd.

Discussion

The Chairman said they were greatly indebted to Mr. Evers for his exposition of the subject. He noticed that it was somewhat difficult to distinguish between the various oils. There were quite a number of difficult points, but he was sure there were several present who had studied the subject.

Mr. T. Edward Lescher asked why in Table II the iodine values of the liver oils should be so divergent, particularly those from the North Sea, all of which were extraordinarily low.

Mr. R. R. Bennett thought the paper bristled with

Table II [IV]

Oil	Species	Sp. gr. 15.5/15.5°	Ref. ind. 40°	Acid value	Saponification value	Iodine value	"Blue" value	Unsaponifiable matter per cent.
Oils of Fish of Gadidæ family								
Cod (mean values)	*G. morrhua*	0.9262	1.4711	0.65	184.7	162.5	13.5	1.17
Coal-fish (Saithe)	*G. pollachius*	0.9241	1.4702	3.40	182.0	146.0	60.0	1.40
Haddock	*G. aeglefinus*	0.9295	1.4737	1.60	183.0	165.0	2.4	1.22
Ling	*Molva vulgaris* ..	0.9236	1.4690	2.40	186.0	147.0	17.8	0.93
Torsk (Brusmer)	*Brosmius brosme* ..	0.9244	1.4738	2.40	181.0	148.0	7.2	3.34
Oils of Elasmobranch fish								
Blue shark	*Carcharias glaucus* ..	0.9120	1.4685	3.60	155.0	134.0	56.0	13.0
,, ...	? ,, ...	—	—	—	—	—	16.7	20.1
Black shark	? ,, ...	0.9169	1.4699	0.28	161.0	135.0	60.0	14.8
Ground shark	*Carcharias littoralis* (?)	0.9194	1.4676	1.20	164.0	136.0	16.0	11.6
Dog-fish	*Acanthias vulgaris* ..	0.9149	1.4666	0.50	166.0	120.0	50.0	11.2
Skate	*Raia batis*	0.9273	1.4732	0.60	184.0	177.0	5.0	2.2
Other Fish-Liver Oils								
Hake	*Merluccius vulgaris* ..	0.9251	1.4715	2.40	183.0	153.0	14.0	2.0
Halibut (solvent extracted) ..	*Hippoglossus hippoglossus*	0.9229	1.4705	11.20	170.0	127.0	475.0	9.76
Halibut (steamed)	.. ..	0.9235	1.4695	1.30	184.0	146.0	14.0	1.72

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interesting points. He was particularly interested in the "blue values," because in the new B.P. there was a standard for blue value of cod-liver oil. He asked Mr. Evers if any of the oils had been examined spectrographically as well as by the antimony method.

Dr. HAMPSHIRE congratulated Mr. Evers on his paper. He seemed to have reached the stage where it was possible to refer an oil to its class. A subcommittee of the pharmacopœia had pointed out that the expression "blue value" was an undesirable one. It seemed to him that the substitution of other fish-liver oils for cod-liver oil required great consideration.

Mr. POWELL called attention to the different values of oils used by different workers.

Mr. G. R. BOYES asked for further information regarding the great variety in blue value in the two samples of halibut-liver oil (solvent- and steam-extracted). If the blue value related to the vitamin content, then steaming had impaired the vitamin content of the oil. It had been established spectrographically, and by means of biological assay, that solvent-extracted samples of halibut-liver oil were higher than cod-liver oil, and the figures shown were higher than those generally reported. He asked if there was any other data regarding the vitamin content of these two specimens of oil.

Mr. WALMSLEY asked if any work had been done on the body oils of these fish.

Mr. EVERS, in reply, said he did not know why the iodine values of the oils varied so much. None of the oils had been examined spectrographically. Blue values would only be considered as very approximate figures. The body oils appeared to be very low in comparison with the liver oils.

The second paper to be taken was:—

The Colorimetric Assay of Ergot

By NOEL L. ALLPORT, A.I.C., and T. TUSTING COCKING, F.I.C., PH.C.

[ABSTRACT]

THE method for the standardisation of ergot and its preparations in the British Pharmacopœia of 1932 is based upon a colorimetric determination of the alkaloids ergotoxine and ergotinine, the results being expressed in terms of "total alkaloids calculated as ergotoxine." There are two stages. The first concerns the extraction of the alkaloids, during which they are finally removed from ethereal solution by successive shakings with (1 per cent.) aqueous tartaric acid solution. This note relates to the second stage, consisting of the official colorimetric test, which differs in details from that originally proposed by M. I. Smith. The dissolved ether is removed from the united acid liquids by warming gently in a current of air), and colorimetric assay is made thereon after dilution with water to a suitable volume. The reagent used is made twenty-four hours before use, and must not be over seven days old. It contains 0.125 per cent. of *p*-dimethylaminobenzaldehyde in a 50 per cent. sulphuric acid (v/v). One mil of solution of alkaloids is mixed with two mils of reagent (which raises the temperature to 45°) and the colour is developed by exposing the mixture to bright light. When the blue-violet colour attains a maximum its intensity is compared with that obtained by treating similarly one mil of a solution containing 0.012 per cent. of ergotoxine ethanesulphonate. It is stipulated that test coloration should not deviate more than 20 per cent. from that of standard. The ratio of blue and red colours to match the violet is constant, and it is convenient, as herein, to take only the blue into consideration for purposes of calculation.

The official reagent corresponds to Smith's reagent diluted with an equal volume of water, but the composition of the reaction mixture is made the same by using half the amount of double-strength solution of alkaloids. Some rise in temperature is necessary to aid colour formation, and the researches of the Ergot Subcommittee of the Pharmacopœia Commission found that the rise to 45° C. with the half-strength reagent gave the best results. The original reagent causes destruction of alkaloid by overheating. Replacement of sulphuric acid by hydrochloric acid overcomes this objection, but colour development in inhibited to a greater extent by traces of peroxide in the ether used for alkaloidal extraction. On a bright summer day the colour may develop in about ten minutes, but full colour development is difficult to ensure in winter. A mercury vapour lamp or carbon arc may be used, but ordinary artificial light is insufficient. Much time may be consumed in adjusting the concentration of solution of alkaloids to that requisite for final comparison.

The present research was undertaken to simplify the colorimetric assay of ergot by eliminating the need for exposure to light.

A mixture of phosphoric and sulphuric acids hastens colour development, but the improvement is not sufficient to justify the change from 50 per cent. sulphuric acid alone. Other aldehydes offer no advantage over *p*-dimethylaminobenzaldehyde in developing colour without exposure to bright light, most of them being less sensitive. Eventually it was found that under certain conditions traces of ferric chloride causes full colour development within one minute without exposure to light. The reagent finally adopted consists of a solution of *p*-dimethylaminobenzaldehyde (0.125 per cent. w/v) in sulphuric acid (65 per cent. v/v) to which ferric chloride (0.005 per cent. w/v) is added. The quantity of ferric chloride exceeds slightly the minimum amount actually necessary, but unless sufficient is present the development of colour is uncertain. Smith's (concentrated sulphuric acid) reagent is much more sensitive to increasing concentration of ferric chloride than is the reagent made with 65 per cent. of acid. The inhibiting effect of peroxide on the new reagent is slightly more than with the official reagent, but much less so than with the reagent prepared with hydrochloric acid. The presence of four parts per million of peroxide (calculated as hydrogen peroxide) in the ether causes a decrease of about 5 per cent. in the colour value, whereas in the case of the hydrochloric acid reagent the decrease in colour value is about 30 per cent. The possibility of this sensitivity to peroxide being due to the chlorine ions led to trial of reagents containing ferric sulphate, but this offers no advantage over ferric chloride. The importance of using for the extraction of the alkaloids pure anæsthetic ether as specified in the Pharmacopœia cannot be over-emphasised.

The proposed reagent has been compared with the official reagent in testing a number of samples of ergot and its preparations. The results are entirely satisfactory, as shown in the following table:—

RESULTS OBTAINED BY INDEPENDENT OBSERVERS USING THE OFFICIAL AND THE PROPOSED REAGENTS

Nature of sample	Per cent. alkaloids calculated as ergotoxine	
	Using official reagent warming to 45°C. and exposing to light	Using proposed reagent without warming or exposing to light
(1) Drug	0.214	0.216
(2) Drug	0.147	0.146
(3) Drug	0.180	0.183
(4) Drug	0.194	0.194
(5) Liquid extract (B.P. 1914) ..	0.008	0.008
(6) Liquid extract (old sample)..	0.019	0.020
(7) Liquid extract	0.054	0.056
(8) Liquid percolate	0.155	0.162
(9) Liquid percolate	0.020	0.020
(10) Strong extract (paste) ..	0.484	0.488

SUMMARY

The colorimetric determination of the alkaloids of ergot using *p*-dimethylaminobenzaldehyde has been critically examined.

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It has been shown that many aromatic aldehydes yield similar colours with ergotoxine in the presence of mineral acid.

The necessity for warming the reaction mixture and exposing it to light in order to allow the colour to develop may be obviated by the addition of a trace of ferric chloride to the reagent, and the use of a slightly stronger acid.

By the use of the proposed reagent the colour develops within one minute and may thus be measured almost immediately. It possesses the additional advantages of being ready for use immediately it is made and that its activity remains unimpaired for about a month if kept in the dark. The investigation was made in the laboratories of The British Drug Houses, Ltd.

In the absence of the authors this was read by Mr. R. R. Bennett.

Discussion

The Chairman, in opening the discussion, said it was interesting to note that although the new Pharmacopœia was not yet published, there were already criticisms of the tests. He wondered whether the ferric chloride did act as a catalyst, or whether there was some reaction involved.

Mr. Evers said the position in regard to the colour test was curious, being alternately in favour and discarded. He regarded as valuable the authors' suggestions relating to ferric chloride.

Dr. Hampshire presumed the authors did not impugn the pharmacopœial method, rather they had attempted to shorten the procedure; but had they not introduced other sources of error, e.g., in peroxide in the ether and the temperature? The Pharmacopœia Commission tried to produce a preparation which contained a definite amount of ergotoxine.

Mr. Powell referred to the variable nature of light in winter, and the tendency for the sample to go on developing blue colour, which vitiates the test.

Mr. Bennett, in thanking those who had taken part in the discussion, said he was sure the authors had no wish to impugn the B.P. method.

The next paper, read by Mr. Corfield, was on:—

The Determination of Colchicine in Colchicum Corm and Seeds and the Official Colchicum Preparations

By P. A. W. Self, B.Sc., F.I.C., Ph.C., and C. E. Corfield, B.Sc., F.I.C., Ph.C.

The increasing demand for standardised preparations of colchicum has led to the unstandardised official preparations of the B.P. 1914 being replaced by U.S.P. galencials. The necessity for including standardised preparations of colchicum corm and seed in the British Pharmacopœia of 1932 provided an opportunity for a complete examination of assay methods. This has led to the introduction of a more satisfactory process for assay.

The methods formerly used in colchicum assay are those of Farr and Wright, Davies and the U.S.P. X.

Farr and Wright's process is a very long one. It involves shaking out the alkaloid twice with chloroform, as well as three extractions with petroleum ether, precipitation with iodine and two filtrations. The alkaloid obtained is very brown in colour and impure, being incompletely soluble in water.

Davies' method is a little shorter, but still involves two extractions with chloroform, a precipitation and three filtrations. It is doubtful whether extraction is complete, the volumes of chloroform prescribed being comparatively small. The alkaloid obtained is evidently not pure, being brownish yellow in colour and not completely soluble in cold water, particularly in the case of the residue obtained in the assay of the seeds.

The Method of the U.S.P. X. is slow and tedious in application, although simpler than either of the two others in principle. The chief defects are: The filtration of the lead subacetate solution is slow; it involves the taking of two aliquot parts; and the difficulty of extracting the colchicine from 100 c.c. of an aqueous solution. The last is a serious objection, owing to the solubility of the alkaloid in water and the fact that 100 c.c. of solution represents only 5 grams of the drug. Moreover, obstinate emulsions are frequently formed. The use of dilute acid in the final extraction of the alkaloidal residue is unnecessary since pure colchicine is readily soluble in cold water alone. The extracted alkaloid is comparatively pure.

Preliminary experiments showed that precipitation by iodine is, under suitable conditions, as complete as precipitation by phosphotungstic acid. An attempt to simplify Farr and Wright's process was unsatisfactory. It was found that the alkaloid extracted from solutions containing sodium hydroxide was much lighter in colour than that obtained from ammoniacal solutions.

Alcoholic extracts of colchicum seed or corm, when taken up in water, were purified much more thoroughly by washing with ether than with light petroleum. The aqueous solutions after extraction with ether were still very cloudy, and it was impossible to obtain clear filtrates. By using a 20-per-cent. solution of sodium sulphate with a very small quantity of powdered talc, perfectly bright solutions were obtained on filtration. When this liquid was made alkaline with sodium hydroxide and extracted with chloroform, an alkaloid was obtained from the seeds which was completely soluble in water. In some experiments a little acid was added to the sodium sulphate solution, but no more alkaloid was obtained, and it was slightly less pure.

The following methods are recommended for accurate assay of colchicum seed and corm:—

Colchicum Seed

Take 20 gm., in coarse powder, mix with 30 c.c. of alcohol (95 per cent.) and heat on a water bath for about fifteen minutes. Transfer to a continuous extractor and extract for three hours. Cool the extract, allow to stand for half an hour and filter, washing the filter with alcohol until free from alkaloid. Evaporate the filtrate to dryness on a water bath, wash the residue into a separator with 20 c.c. of 20-per-cent. solution of sodium sulphate and 50 c.c. of ether, well shake, allow to separate and run the lower layer into a second separator containing 50 c.c. of ether, again well shake and separate. Wash the dish with a further 5 c.c. of the solution of sodium sulphate, transfer to the first separator, shake, separate, run into the second separator, shake and again separate. Repeat the washing of the dish and contents of the two separators in the same manner with a further three portions of 5 c.c. each of water. Unite all the aqueous liquids, heat on a water bath until the ether is completely expelled, cool, add 0.2 gram of purified talc and make up to 50 c.c. with solution of sodium sulphate. Allow to stand for about an hour, frequently shaking, and filter, rejecting the first 5 c.c. of the filtrate. Take 40 c.c. of the filtrate (representing 16 grams of the seeds), shake with 40 c.c. of ether, separate and wash the ether with three successive portions of 5 c.c. each of water. Mix the aqueous liquids, add 50 c.c. of chloroform and shake and then add 2 c.c. of $N/1$ sodium hydroxide and again well shake. Run off the lower layer into a second separator containing 2 c.c. of $N/10$ soda and 15 c.c. of water, shake, separate and filter the chloroform through a double filter. Continue the extraction with further portions of chloroform, washing each portion with the alkaline liquid contained in the second separator and filtering, as before. Evaporate off the chloroform, add 2 c.c. of alcohol, evaporate, add a further 2 c.c. of alcohol and again evaporate, dry at 100° C. and weigh the residue of colchicine. The weight of residue obtained multiplied by 6.25 gives the percentage of colchicine in the seed.

Colchicum Corm

Take 20 gm., in coarse powder, and proceed by the method given for Colchicum Seed with the following addition: To the weighed residue add about 10 c.c. of water, allow to stand for a short time and filter through a small filter. Wash the dish and filter with water until the alkaloid is completely removed. Dissolve any insoluble matter on the filter in a little alcohol, return to the dish containing the remainder of the insoluble matter, dry at 100° C. and weigh. Subtract the weight so obtained from the weight of total residue in order to obtain the weight of pure

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colchicine. The weight of pure colchicine obtained multiplied by 6.25 gives the percentage of colchicine in the corm.

Three hours' continuous extraction with alcohol is sufficient for complete extraction of powdered colchicum. The results obtained are not less satisfactory than by percolating with 70-per-cent. alcohol in the cold as in Davies' method. Any slight emulsification during the first two washings with ether may be disregarded by transferring this to the next stage, together with the clear aqueous layer. In cold weather evaporation of ether may lower the temperature and cause some separation of sodium sulphate. In this case a slightly warmed solution of the salt may be used. The final extraction with chloroform needs a considerable number of shakings owing to the high solubility of colchicine in water, but there is little or no tendency to emulsification. When a high degree of accuracy is not required the assay of the corm may be carried out as in the case of the seed since the amount of insoluble matter is usually very small.

The results obtained by the various methods are summarised in the tables below:—

TABLE I.—Colchicum Seed

	Process used	Result	Properties of the residue obtained
1	Process recommended	0.478 per cent.	Pale lemon yellow in colour; wholly soluble in cold water.
2	As (1) without talc, and ammonia in final washing instead of N/1 sodium hydroxide	0.471 ,, ,,	Pale lemon yellow in colour; 0.003 per cent. insoluble in cold water.
3	Farr and Wright's Process	0.724 ,, ,,	Yellowish brown in colour; incompletely soluble in cold water.
4	Method of the U.S.P. X	0.512 ,, ,,	Lemon yellow colour.
5	Davies' Process (no alkali in final extraction)	0.460 ,, ,,	Brownish yellow in colour; 0.038 per cent. insoluble in cold water.
	Davies' Process (using ammonia in final extraction)	0.435 ,, ,,	Dark yellow in colour; 0.03 per cent. insoluble in cold water.

TABLE II.—Colchicum Corm

	Process used	Result	Properties of the residue obtained
1	Process recommended	0.245 per cent. (soluble alkaloid)	Pale lemon yellow in colour; 0.007 per cent. insoluble in cold water.
2	As (1) but percolating with 70 per cent. alcohol	0.243 per cent. (soluble alkaloid)	Pale lemon yellow in colour; 0.012 per cent. insoluble in cold water.
3	Farr and Wright's Process	0.368 per cent.	Yellowish brown in colour; incompletely soluble in cold water.
4	U.S.P. X.	0.250 ,, ,,	Lemon yellow in colour.
5	Davies' Process (no alkali in final extraction)	0.284 ,, ,,	Lemon yellow in colour; 0.013 per cent. insoluble in cold water.
6	Davies' Process (using ammonia in final extraction)	0.285 ,, ,,	Lemon yellow in colour; 0.09 per cent. insoluble in cold water.

Farr and Wright's process gives very high results, due to impure character of alkaloid. The method of the U.S.P. X. gives results which are slightly high for both seed and corm Davies' assay process gives slightly low results for seed and slightly high results the corm. The alkaloid is not quite pure, especially in the case of the seeds. The results vary during final extraction, being distinctly lower with ammonia than without alkali.

Preparations Of Colchicum

The new Pharmacopœia includes three preparations of colchicum—Liquid Extract of Colchicum, Tincture of Colchicum and Dry Extract of Colchicum. The two former are made from the seed (the tincture by dilution of the liquid extract) and the dry extract is made from the corm. Assays on liquid extract (20 c.c.) and tincture (200 c.c.) indicate that it is sufficient to evaporate off the alcohol. In the case of the dry extract (5 gm. being taken) it is desirable to extract with alcohol in a continuous extractor to remove matter insoluble in alcohol as much as possible. It is necessary to correct for the insoluble matter in the residual alkaloid in the manner recommended in the assay for the corm.

A sample of Liquid Extract of Colchicum supplied by the Pharmacopœia Commission gave 0.296 per cent. of colchicine, which was completely soluble in cold water. Dry Extract of Colchicum, supplied by the Pharmacopœia Commission, gave 0.795 per cent. of soluble alkaloid and 0.086 per cent. of matter insoluble in water. A second sample showed 1.285 per cent. of soluble alkaloid and 0.060 per cent. of matter insoluble in cold water. In each case the alkaloidal residues were much darker than in other assays, and it appears that a certain amount of alkaloidal decomposition occurs during manufacture of this preparation.

Summary

The assay processes now in use for colchicum corm and colchicum seed and preparations of these two drugs have been reviewed.

The method of Farr and Wright for the assay of colchicine in the corm and seeds gives very high results and must now be regarded as practically useless.

The assay process described by Davies and the method of the United States Pharmacopœia give much more accurate results but are complicated and troublesome to carry out.

The new processes are described by which a purer alkaloidal residue is obtained. The use of phosphotungstic acid and iodine are unnecessary for the purification of colchicine, and in the process recommended the inert matter is removed by treating the colchicine solution with sodium sulphate and ether. In the assay of the corm and the dry extract prepared from it, a small amount of impurity in the final residue is removed by dissolving out the colchicine with water.

These processes are much simpler in character, and give consistent and accurate results for the proportion of colchicine in the two crude drugs and the galenical preparations prepared from them.

Discussion

Mr. Deane, referring to the pharmacopœial test, suggested leaving the extract of syrupy consistency.

Mr. Corfield said it was true that workers sometimes had difficulty in determining what was meant by published words. In the seed test he thought the alcohol in the liquid should be removed by evaporation.

The next paper, which in the absence of the author, was read by Mr. John Keall, was:—

Some Proposed New Formulas for the British Pharmaceutical Codex

By H. Treves Brown, B.Sc., Ph.C.

[Abstract]

In connection with the revision of the British Pharmaceutical Codex, the pharmacy subcommittee have submitted recommendations to the Codex Revision Committee for the inclusion of many new formulas and for important alterations in a number of formulas of the 1923 Codex.

Elixir Ephedrinæ Hydrochloridi

Ephedrine hydrochloride	4.6 gm.
Distilled water	83.3 mils
Glycerin	200.0 mils
Glycerin of saffron	50.0 mils
Spirit of chloroform	50.0 mils
Alcohol (90 per cent.)	125.0 mils
Tinctnre of lemon	50.0 mils
Syrnp	to 1000.0 mils

Glycerinum Bismuthi Carbonatis

Two formulas are given for this preparation in the present Codex, one using bismuth nitrate, and the other the subnitrate. Glycerin of bismuth carbonate is stated to contain about 50 per cent. w/v of bismuth oxycarbonate, and there is a further statement that "mixtures prepared therewith contain the bismuth in a better state of suspension than when ordinary bismuth oxycarbonate is used." This statement also

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appeared in the 1907 Codex, and was doubtless true at that time; but the bismuth carbonate of to-day is a very different product from that obtainable twenty-five years ago. The Committee accepted the suggestion that glycerin of bismuth carbonate should be prepared directly from the official bismuth carbonate. The following formula was accepted; it can be prepared in a few moments from materials readily available and is identical with an average sample made from the old formula:—

Bismuth carbonate	500 gm.
Distilled water	500 mils
Glycerin	to 1000 mils

Glycogelatinum

Complaints have been made from time to time that the present B.P.C. basis for throat pastilles is too soft. Experiments on the optimum proportions of glycerin and distilled water to be used with 20 per cent. of gelatin resulted in the acceptance by the Committee of the following formula:—

Gelatin	200 gm.
Glycerin	400 mils
Sucrose	50 gm.
Citric acid	20 gm.
Sodium benzoate	2 gm.
Oil of lemon	1 mil
Solution of carmine	10.4 mils
Triple orange-flower water	62.5 mils
Distilled water	to 1000 gm.

Soak the gelatin in one and a-half times its weight of distilled water until softened, add the glycerin and heat on a water bath until the gelatin is dissolved and the mixture weighs 850 gm.; add the sucrose, citric acid and sodium benzoate previously dissolved in the triple orange-flower water, the oil of lemon, the solution of carmine and sufficient distilled water to produce the required weight. Strain through muslin and allow to cool.

Guttæ Physostigminæ

Eserine eye drops are at present prepared with the sulphate. The salt official in the new Pharamcopœia is the salicylate, and the monograph on this salt in the 1923 Codex states that its solutions do not become pink so readily as solutions of the sulphate. It was thought desirable to confirm this statement, and also to try the effect of boric acid in preventing coloration, although it is usually stated that the development of colour is accompanied by little or no loss of myotic activity. One per cent. solutions of each salt, prepared with recently boiled and cooled water, were placed in completely filled bottles, and also in partly filled bottles which were loosely corked; samples of each of these were stored in the light and in the dark. In addition to the solutions prepared with distilled water only, solutions of each salt were made containing also 1 per cent. and 3 per cent of boric acid, and samples of these were similarly stored. The general conclusions reached may be summarised as follows:—

(1) Boric acid has little or no effect on the sulphate solution, but the addition of 3 per cent. is a considerable improvement to the salicylate solution.

(2) In the dark, the sulphate alone is quite satisfactory, and equal to the salicylate with 3 per cent. of boric acid.

(3) In the light, the salicylate alone is slightly better than the sulphate alone, but the salicylate with 3 per cent. of boric acid is much better than the sulphate, whether alone or with boric acid.

(4) In all cases, the exclusion of air is advantageous. It will be seen from the above results that the salicylate with 3 per cent. of boric acid is never less satisfactory than the sulphate, and in the majority of storage conditions is superior.

The following formula was therefore accepted by the Committee:—

Physostigmine salicylate	1 gm.
Boric acid	3 gm.
Sterilised water	to 100 mils

The 1923 Codex gives the solubility of physostigmine salicylate as 1 in 130; the new Pharmacopœia says that it is soluble in about 100 parts of water, and employs a 1 per cent. w/v solution in two of the tests given in the monograph; the U.S.P. figure is 1 in 75, and Martindale gives 1 in 150. No difficulty was experienced in preparing a 1-per-cent. solution for the above tests, using distilled water at laboratory temperature.

Linimentum Ammoniæ

It is well known that the new Codex is including a number of preparations of the 1914 Pharmacopœia which have been omitted from the B.P. 1932. Among these is liniment of ammonia, the B.P. 1914 formula for which employs 25 per cent. of almond oil. This liniment is rarely required in prescription work. J. H. Franklin has recommended a liniment prepared with liquid paraffin, oleic acid and olive oil, and has found that this preparation does not thicken on standing for three months. A sample made to this formula, using olive oil having an acid value of 5.6 (and, therefore, just within the limit laid down by the new B.P. for olive oil for liniments), thickened very considerably, becoming barely pourable after standing for two months. It was decided to replace the two oils of the B.P. 1914 preparation with liquid paraffin and oleic acid, and the following formula was found to yield a satisfactory liniment, which did not thicken, and showed only a small degree of separation after prolonged standing:—

Dilute solution of ammonia	250 mils
Oleic acid	25 mils
Liquid paraffin	725 mils

Mix the oleic acid with the liquid paraffin, add the dilute solution of ammonia and shake.

Linimentum Calaminæ

The considerations dealt with in respect of liniment of ammonia apply equally to liniment of calamine; the thickening in this case occurs more rapidly than with liniment of ammonia. Further, if a pharmacist does not avail himself of the pharmacopœial permission to use an olive oil of higher acid value for making liniments he will experience difficulty in making this preparation, for the amount of calcium oleate formed will not be sufficient to ensure stability. The final formula is:—

Calamine	45.7 gm.
Zinc oxide	34.3 gm.
Oleic acid	5.0 mils
Wool fat	10.0 gm.
Liquid paraffin	485.0 mils
Solution of calcium hydroxide	500.0 mils

Melt the wool fat in the liquid paraffin with the aid of gentle heat and add the oleic acid. Gradually add this mixture, with constant trituration, to the calamine and zinc oxide previously mixed with the solution of calcium hydroxide.

Liquor Calcis Sulphuratæ

This solution is now of more value in horticultural practice than in pharmacy, but the formula of the B.P.C. 1923 was brought to the notice of the Committee because, on an order for the B.P.C. article, a solution containing 5 per cent. total sulphur was supplied. This was found to be stronger than had been obtained elsewhere, although inspection of the Codex formula would suggest that a 5 per cent. solution was intended. The following formula was accepted; in view of the fact that very much stronger solutions are available in commerce, it was deemed advisable to include in the monograph a standard of from 4 to 5 per cent. w/v of total sulphur, and also to give an assay process.

Calcium oxide	25 gm.
Sublimed sulphur	50 gm.
Distilled water	to 1000 mils

Shake the calcium oxide with an equal quantity of distilled water, add the sulphur and 500 mils of distilled water, and boil in a flask until the sulphur is dissolved; cool, filter, and pass sufficient distilled water through the filter to produce the required volume.

Liquor Quininæ et Strychninæ

This solution is used in conjunction with solution of ferrous phosphate for the extemporaneous production of Easton's syrup. The formula in the present Codex is

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of such a strength that 90 minims represents the alkaloidal content of one fluid ounce of the B.P. 1914 syrup. This strength has proved inconvenient in practice, and wholesale houses usually supply solutions which are eight times the alkaloidal strength of the syrup. It is not possible to prepare a solution of this strength, using phosphoric acid as solvent, even when due allowance is made for the reduced quantity of strychnine in the new B.P. formula, and it was therefore suggested that the phosphoric acid should be replaced by another acid.

Various experiments in mixing and storage are mentioned by the author. The new formula for liquor quininæ et strychninæ is as follows:—

Quinine sulphate	118.4 gm.
Strychnine hydrochloride	2.4 gm.
Hypophosphorous acid	60.0 mils
Glycerin	620.0 mils
Distilled water .. .. .. to	1000.0 mils

Triturate the quinine sulphate and the strychnine hydrochloride with a mixture of the glycerin and 225 mils of distilled water and the hypophosphorous acid and stir until the alkaloidal salts have dissolved. Then add sufficient distilled water to produce the required volume.

The quantity of syrup in eight fluid ounces of the new B.P. Easton's syrup is 4 fl. oz. 230.4 mils, very nearly 4½ fl. oz. Hence the following formula yields a syrup differing from the new official product only in the presence of 0.75 per cent. of hypophosphorous acid:—

Solution of quinine and strychnine..	1 fl. oz.
Solution of ferrous phosphate ..	1 fl. oz.
Glycerin	½ fl. oz.
Distilled water	1 fl. oz.
Syrup .. .. to	8 fl. oz.

The solution darkens on long exposure to air and light, but keeps very satisfactorily in the dark, and also in the light if in completely filled bottles. The syrup prepared from it also darkens on being stored in partly filled bottles exposed to the light; it does not, however, differ in this respect from the new official product, but, unlike the latter, no deposit has formed even on storing for three months.

Liquor Tolutanus

Dilution of this solution with seven times its volume of syrup forms a convenient method of preparing a syrup of tolu somewhat similar to the product made by the process of the Pharmacopœia. The 1923 Codex states that the product of the formula given therein yields on dilution with syrup a preparation which is more aromatic than the B.P. syrup of tolu. Apart from this difference of flavour there is a considerable difference in the sugar contents of the two preparations, as has been pointed out by Liverseege. The position has been further complicated by the inclusion in the B.P.C., 1923, of a syrup to which the pharmacopœial Latin title was applied. It is proposed to delete syrupus tolutanus from the new B.P.C., and the compilers of the new Pharmacopœia have adopted syrup of tolu as the English title. The formula accepted is:—

Balsam of tolu	100 gm.
Alcohol (90 per cent.)	300 mils
Kaolin	100 gm.
Sucrose	500 gm.
Distilled water .. .. .. to	1000 mils

Dissolve the balsam of tolu in the alcohol, add the kaolin and 350 mils of distilled water heated to 70°, shake, allow to stand for twenty-four hours and filter; dissolve the sucrose in the filtrate and pass if necessary sufficient distilled water through the filter to produce the required volume.

This result would seem to indicate that in the official process for syrup of tolu, according to which the balsam is extracted with boiling water, more than half the aromatic principles are wasted. The author thanks the Codex Revision Committee for permission to publish these formulas, and to express his appreciation of the suggestions and guidance received from members of the pharmacy subcommittee.

Discussion

The Chairman said there are many points which must arise in the minds of practising pharmacists as the result of this paper. He himself had doubts if the new formula for lin. ammon. would be quite as effective as if made with vegetable oil.

Mr. J. P. Gilmour, speaking in regard to glycerin. bismuthi, reminded members that twenty-five years ago the precipitation method gave a more diffusible preparation than the carbonates then on the market. Preparations made from the newer carbonates, however, gave as diffusible a product owing to their fine state of subdivision.

Mr. J. H. Franklin thought the formula for glycerin. bismuthi carb. would undoubtedly give a more satisfactory product than the older form, and inquired if it was necessary to use bismuth carbonate of a specific density. He noted that in glyco-gelatin preservative was used. We in this country had been slow in making use of preservatives—this he regarded as a defect in English pharmacy. In this formula he suggested the use of oil in place of orange-flower water. The formulas for lin. ammon. and lin. calaminæ met with his approval, and he congratulated the author on the use of hypophosphorous acid in the liquor quin. et strych. He regarded the introduction of sucrose in the liquor tolutanus as ingenious, as it will ensure conformity with the B.P. article.

Mr. A. R. Melhuish said the paper would help to give a true idea of the work the author had done. Glycerin of saffron, he pointed out, has a fleeting colour. Glyco-gelatin was an improvement, but care must be taken not to make it too hard. The suggested lin. calaminæ he regarded as an advance.

Mr. Rae suggested the use of tartrazine yellow, or something similar, in place of glycerin of saffron, and advocated the inclusion in the Codex of such harmless solutions for colouring purposes. He thought it would be better to use glucose as the preservative in the Easton's syrup formula.

Mr Jackson asked if it would not be better to specify "powdered gelatin" instead of just "gelatin." He regarded the lin. ammon. suggestions as intriguing; enthusiasm had lead the author away. If this formula became official, the preparation would become extinct. It was essential to use vegetable oil.

Mr. Bull said that while the suggested formulas were quite good they needed to be modified, and rounded off in regard to the decimals. He, too, thought that something better than saffron could be used for colouring. In the glycerin. bismuthi carb. water should be made the variable instead of the glycerin.

Mr. T. Edward Lescher commented on the difference between bismuth carbonate of twenty-five years ago and to-day; but, he said, it was possible to-day to have two samples equally light, yet the one less suspensible than the other.

Mr. Berry said that after trying glucose and hypophosphorous acid as preservatives for Easton's Syrup he had turned both down. Storing in a full bottle was the only way to preserve it. Glycerin was tried, but this also colours. Paraffin alters the character of lin. ammon., but no vegetable oil gives a satisfactory preparation.

Mr. Deane reminded members that in agriculture it was the polysulphide sulphur which was valuable, and if therapy was parallel this method was not satisfactory.

Mr. Brewis pointed out that glucose was one of the products in which sulphur dioxide is a permitted preservative.

Dr. Hampshire suggested that the author should have made experiments using amber bottles for the guttæ physostigminæ. Lin. calaminæ is not a liniment in the ordinary sense of the term, and any changes in this preparation should be submitted to dermatologists. The liquor for Easton's syrup raised the question of the use of solutions of this kind by pharmacists, and he pointed out that the increasing importance of the Codex brought with it added responsibilities and the need for ethical

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considerations. The syrup of the new Pharmacopœia will keep better than that of the B.P. 1914.

Mr. KEALL, in reply, characterised the discussion as a most valuable one.

The CHAIRMAN thanked Mr. Keall for reading the paper and asked him to convey the thanks of the meeting to the author.

Science Section

Tuesday Afternoon

The first paper taken was:—

The Assay of Santonin in *Artemisia*

BY JAMES COUTTS, PH.C.

[ABSTRACT]

DESPITE the fact that santonin may be isolated in a high state of purity its quantitative separation is a matter of some difficulty. No completely satisfactory method of assay has as yet been formulated, and the numerous suggested methods yield results of varying accuracy. Of the three methods which have been suggested, gravimetric, polarimetric and volumetric, only the first has received any great deal of attention, and it alone has been developed to give results of any consistency. These gravimetric methods generally attempt the separation of the santonin by a process of crystallisation in order to remove the resinous matter. A correction for the santonin left in solution in the mother liquor is applied. Such methods are at best empirical, and are only suitable for the comparative sampling of drugs of similar nature and santonin content. They cannot be applied to a low santonin-content drug because of the magnitude of the correction. Similarly, owing to the different nature of the extractive and the larger amount present, the methods generally are often not applicable to the analysis of a drug consisting of entire herb or of leaves, alone, or admixed with flowerheads. The commercial production of santonin is already in operation, using the entire Indian herb as source. In view of these facts it was decided to review all the available methods of assay and to find, if possible, a process generally applicable for the quantitative determination of santonin.

CRITICISM OF THE PROCESSES

Polarimetric.—Favrel's polarimetric assay yields results which approximate closely to those obtained by gravimetric methods. It would appear that some correction should be made for santonin lost in shaking with 15-per-cent. sodium carbonate solution, as it has been shown that when using pure chemicals, a certain amount of santonin is extracted from the benzene solution by this operation. The figures found for pure chemicals are not applicable for a crude extract, but it is assumed that there would be some loss to the sodium carbonate solution when it is shaken with a crude chloroformic extract. Dragendorff also gives a correction of 3 mgm. to be added for solubility of santonin in 8-per-cent. sodium carbonate solution when 10 c.c. is used to wash crystals. This cannot, however, be confirmed, as it was found that on washing the fairly clean crystals from an assay, with this solution, there was no appreciable diminution in the weight. Furthermore, the essential oil present in the crude drug is still present in the final solution, and as it is also optically lævorotatory, the reading is increased. The oil produces only a small rotation of polarised light, but it is nevertheless sufficient to effect the result quite noticeably in the case of drugs of low santonin content. There is also the possibility of other optically active substances being present and affecting the result, while remaining undetected as interfering agents. Mouton gives examples of this, and shows that even when santonin was present in the drug, a deviation to the right was observed. No similar phenomenon has been noticed by the present author. This polarimetric method is little used.

Volumetric.—The volumetric assay of Kariyone and Kimura is not satisfactory. The results obtained by using it are always high, evidently due to the saponification of some other substance. Mouton and Favrel have criticised this method, and their statements that erroneously high results are given by it are in accordance with the findings of the author. Favrel's statement that the method of the Japanese workers does not extract all the santonin present is, however, unfounded, as the extraction process is the same as that used in Katz' method, which he finds accurate, and which he himself uses in his polarimetric estimation. Katz' volumetric method, probably on account of its length and intricacy, is not much used. Although Katz gives figures for some estimations, which show a close relationship with those obtained by his gravimetric method, the usefulness and accuracy of the method do not appear to have been confirmed. The extra purification by taking up with 15-per-cent. alcohol is an advantage over the process of Kariyone and Kimura.

Gravimetric.—All the gravimetric methods mentioned give reasonably accurate results, although these are dependent to some extent on individual manipulation, and are very liable to variation with varying conditions. They also give results varying among themselves by reason of the different substances present in the mother liquors from which the santonin is made to crystallise. Apart from the factors the biggest objection is to the correction required to be made for the solubility of the santonin in the alcohol used in the final stage of all of them, except Palkin's. It is difficult to imagine this long, complicated process as a practical method of assay. This correction, usually taken as 6 mgm. per 10 gm. of solution, is necessarily an arbitrary one, since the other substances in solution vary constantly and so influence the solvent action. The correction is usually regarded as small, but in a drug containing 2 per cent. of santonin it corresponds as a rule to about 30 per cent. of the amount of santonin actually recovered. Such a drug is considered good. In an inferior drug containing 1 per cent. of santonin the correction is very nearly, if not over, 100 per cent. of the recovered santonin, a fact which shows how unsatisfactory such a correction is. It also shows why the processes do not give good results or are even inapplicable in the case of drugs of low santonin content. In the case of drugs somewhat low in santonin content, but for which the processes are applicable, the final weight of santonin is inconveniently small, which would not be the case but for the amount left in the alcohol.

NEW GRAVIMETRIC METHOD

The estimation is carried out by extracting 14 gm. of the dried, coarsely powdered drug, by shaking frequently during six hours with 140 mils of benzene. 101 mils of the liquid is filtered off and shaken briskly for five minutes in a separating funnel with 35 mils of 8-per-cent. sodium carbonate solution. Separation is allowed to take place and 80.5 mils of the benzene solution, corresponding to 8 gm. of the drug, is decanted into a flask and evaporated to dryness on a water bath. The residue is extracted by heating for ten minutes with 60 mils of saturated barium hydroxide solution at 95° C., and the solution is immediately filtered into a flask, the flask and filter being washed with two portions, each of 10 mils, of saturated barium hydroxide solution at 95°, and the filtrates united. The flask is then plugged with cotton-wool and the solution is allowed to cool, made slightly acid by the addition of 5 mils of 25-per-cent. hydrochloric acid, and set aside for twenty-four hours to crystallise, being gently agitated occasionally. The crystals are collected in a tared Gooch crucible, any crystals remaining in the crystallising flask being washed into the crucible with small portions of the filtrate. The crucible and crystals are finally washed with 10 mils of cold water and dried

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to constant weight at 100° C. After cooling in a desiccator the weight of santonin is found and represents the weight of santonin present in 8 gm. of the crude drug.

Benzene was chosen as the extracting agent because it extracts less inert and resinous matter than do the other common organic solvents. It is suggested, however, that commercial crystallisable benzene, completely volatile below 95° C., be used, as was done in the present work. Benzol of commerce cannot be completely removed from the extract at the temperature of the water bath, at ordinary pressure. It has been shown that 8-per-cent. sodium carbonate solution has no extractive action when shaken with a solution of santonin in benzene, although 15-per-cent. sodium carbonate solution does extract some of the santonin. The latter solution has no advantage over the 8-per-cent. solution for the present purpose, as can be seen by repeating the shaking with 8-per-cent. solution and by shaking with 15-per-cent. solution after the first extraction with 8-per-cent. solution has been done. In both cases the second alkali layers are practically pure, the 15-per-cent. solution extracting no more than the 8-per-cent. one. A correction is not considered to be necessary for this stage of the assay. No difficulty was experienced in getting the two layers to separate. The crystals obtained are good clean plates, practically free from contamination of any kind and having a melting point of 168° to 170°. The process was tried out on commercial santonica yielding approximately 1.45 per cent. of santonin by Katz', Fromme's and Mouton's methods, and the same result was obtained. The drug for which the process was required was composed chiefly of the leaves of a species of *Artemisia* containing in some cases only a small percentage of santonin, in addition to there being, often, only a few grams of the drug available. It was found that a half or a quarter of the amounts given could be used and a weighable quantity of santonin obtained at the end. The other methods mentioned were not very satisfactory with this drug, Mouton's final solution being strongly coloured green and often yielding no crystals. The other two methods gave very small weights of crystals which were very badly contaminated with resinous matter or no crystals at all were obtained.

Summary

The existing methods for assaying santonin in santonica have been reviewed. A new gravimetric process, applicable for the examination of all classes of crude drugs containing santonin, has been suggested.

The author thanks Dr. J. P. Todd for the interest which he has taken in the work.

Discussion

The Chairman said that santonin was still a strong favourite as an anthelmintic.

Dr. Hampshire asked if the author had looked into the question of separating the santonin in the form of a derivative.

Mr. Corfield said he was very interested in Mr. Coutts's paper. The British Pharmaceutical Codex contained a number of vegetable drugs, and the tendency was to follow the B.P. in including standards. There were all sorts of artemisia on the market. He asked the author if he could give them a reasonable figure for the santonin content of artemisia. In Fromme's method he agreed that the correction was large, but by slight modification of the method that correction could be very considerably reduced. Fromme's method, in his opinion, was one of the most valuable. Mr. Coutt's method, he thought was incomplete until the comparative table of results was included. He asked if the table shortly to be published would include control tests. He would like to see Mr. Coutts's method compared with others in the estimation of santonin in the Persian wormseed now on the market.

In reply, Mr. Coutts said he had tried the method of separating the santonin as a derivative as suggested by Dr. Hampshire, but had found it to be inaccurate. Indian wormseed seemed to be quite satisfactory as a source of santonin. Control and actual figures would be given in a later paper.

The next paper, read by Dr. Hampshire in the absence of the author, was:—

A Comparison of Tests for Balsam of Peru

By E. M. Smelt, B.Pharm., Ph.C.

[Abstract]

It is generally admitted that balsam of Peru is very liable to adulteration with various substances, including factitious balsam which may even be substituted for it. Several tests are included in various current pharmacopœias, and it was with the object of determining, as far as possible, which tests are the most suitable for the detection of sophistication that these experiments were undertaken. The qualitative tests most commonly occurring in the various pharmacopœias are given by the author, and comprise the light petroleum test, odour of the light petroleum extract, acetic anhydride test, nitric acid test, copper acetate test, alcohol test, chloral hydrate test, carbon disulphide test, specific gravity, and the percentage of balsamic esters and their saponification value.

Seventeen specimens of balsam of Peru were obtained, of which three were believed to be genuine. The qualitative tests mentioned above were applied to each of the seventeen specimens and the results recorded (a table is given). The table shows that the tests run parallel for specimens which appear to be genuine, but they do not agree so well with sophisticated balsams, and it is obvious that a single test is only capable of detecting certain adulterants. In order to check the results, two artificial balsams were prepared, adding known adulterants to a specimen which reacted as genuine to the tests. The same tests were applied to these factitious balsams and the results also recorded. The surprising feature of these results is that the light petroleum test which was prescribed for the detection of artificial balsam, and extolled by Schneider and Tschirch, failed to reject artificial balsam.

In order to determine which adulterants the separate tests detected, approximately 20 per cent. of each of several different adulterants was mixed with separate portions of a specimen which reacted to the tests as genuine balsam and the same tests were applied to the mixtures. The results obtained are given below:—

Test	*Adulterants detected*	*Adulterants not detected*
1. Light petroleum	Canada balsam, copaiba, gurjun balsam, kerosene (not less than 20 per cent.)	Balsam of tolu, colophony, storax, turpentine, castor oil, olive oil, alcohol, benzyl benzoate
3. Acetic anhydride	Canada balsam, copaiba, colophony, gurjun balsam, storax	Balsam of tolu, castor oil, olive oil, turpentine, alcohol, benzyl benzoate, kerosene
4. Nitric acid	Balsam of tolu, Canada balsam, copaiba, colophony, gurjun balsam, storax, turpentine, castor oil, olive oil	Alcohol, benzyl benzoate, kerosene
5. Copper acetate	Canada balsam, copaiba, colophony	Balsam of tolu, gurjun balsam, storax, turpentine, castor oil, olive oil, alcohol, benzyl benzoate, kerosene
6. Alcohol	None	Balsam of tolu, Canada balsam, copaiba, colophony, gurjun balsam, storax, turpentine, castor oil, kerosene, benzyl benzoate
7. Chloral hydrate	Castor oil (after standing for fifteen minutes), olive oil	Kerosene
8. Carbon disulphide	? Gurjun balsam, ? olive oil, kerosene	Balsam of tolu, Canada balsam, copaiba, colophony, storax, turpentine, castor oil, alcohol, benzyl benzoate

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Mixtures of genuine balsam with gurjun balsam or with olive oil were not clear, and the turbidity obtained with carbon disulphide was possibly due to this cause. In addition to turpentine, the presence of such adulterants as copaiba and Canada balsam was suggested by the odour of the light petroleum extract.

Discussion

Mr. Brewis said the only way to get genuine Peru, tolu or copaiba balsam is to obtain it from a reliable source.

The Chairman expressed the thanks of the meeting to the author.

The next paper was:—

A Comparison of the Antidiuretic and Oxytocic Potencies of Commercial Pituitary Extracts

By Frank Wokes

[Abstract]

The author deals first with the accuracy of the rat method for the determination of anti-diuretic potency. In his experiments the accuracy of the method was tested by duplicate assays on seven different extracts. The error on each extract was calculated from the deviation of each result from the average of the two results, and was expressed as a percentage of the latter. Since the true value for each extract was not known, it was not possible to calculate the individual percentage errors accurately, but on the average this method of calculation gives fairly satisfactory results. On the seven extracts the percentage error, calculated in this manner, ranged from 1.8 to 19.2 per cent., and averaged 9.5 per cent. (A table is given.) The average error was thus rather larger than Burn experienced in his five comparisons, and a search was therefore made for any factors which might have caused the increase in the experimental error. The first possibility examined was that the curve of reference, which had been determined by Burn on four sets of sixteen rats, did not apply to the three sets of rats employed in the author's investigation. The response produced by the same dose of the standard pituitary extract in the same set of rats fluctuated considerably from one experiment to another. The widest variation was experienced in the first set of rats, which gave a figure of 1.75 (135 minutes) in their second experiment, and a figure of 7.0 (186 minutes) in their fourth experiment a fortnight later, a difference of 400 per cent. in the response produced by the same dose. The second set of rats gave more regular results, but even these showed a fluctuation of from 1.4 (127 minutes) in their seventh experiment to 4.0 (166 minutes) in their second experiment, a difference of nearly 300 per cent. in the response produced by the same dose. On the other hand, the general trend of the results failed to give definite proof of any alteration in the susceptibility of the rats to pituitary extract, even after they had received a large number of doses.

Another indication that the kidney efficiency of the rats had not appreciably altered during the experiments was afforded by the results given by administration of water only. The large errors observed in some of his duplicate assays, states the author, could not be attributed to the employment of the characteristic curve. The rats employed by Burn weighed between 140 and 240 gm. Those used in the author's experiments were rather larger than this. The larger average weight of the rats may have explained their greater susceptibility to the anti-diuretic activity of pituitary extract. This suggestion is supported by the fact that the first set of rats, which was slightly heavier than the second set, gave on the average a slightly larger response to the same dose of pituitary extract. But this difference in average weight would not explain the wide fluctuations in the response of the same group to the same dose on different days. Neither does it seem likely to account for the larger experimental errors in some of the duplicate assays, since the average error was no larger in assays employing two groups than in those employing the same group for both assays. Another possible source of error lay in the fact that the total amount of urine excreted during different experiments was a varying proportion of the amount of water administered. But careful analysis of the results showed that there was no fixed relation between these variations and the fluctuations in response, so that the large errors experienced in some duplicate assays were not due to these variations.

Thus, states the author, it seems that the variation in response of the rats on different days to the same dose of pituitary extract was not due to any alteration in the external conditions, but probably to some internal changes in the rats themselves, possibly connected with the hormone balance.

It seems clear, however, that the average error of the anti-diuretic method is not more than 10 per cent.

The author then deals with the accuracy of the isolated uterus method for the determination of oxytocic potency. The most satisfactory assays, he states, are those in which the extract is proved to contain more than a certain number of units per c.c., and less than another number of units per c.c. The difference between these two results indicates the accuracy of the assay. Sixteen different samples of pituitary extract made by manufacturers in this country and in America were assayed both for their anti-diuretic and for their oxytocic potency. The results are given in a table, which also includes the results on the four extracts previously published by Burn. The results show that although the oxytocic potency in the majority of commercial pituitary extracts probably runs fairly parallel with the anti-diuretic potency, it is not safe to assume that in any given extract either of these activities can be taken as a safe guide to the other. At present most of the pituitary extracts in use are only assayed for their oxytocic potency. Clinical reports have from time to time indicated that the anti-diuretic potency of different extracts may vary considerably, even although these extracts possess the same oxytocic potency. This investigation has shown that amongst extracts, all supplied as containing 10 units per c.c., the variation in anti-diuretic potency may be as large as 400 per cent. (i.e., from 5.7 units per c.c. to 24 units per c.c.). Therefore, it seems clear, concludes the author, that any pituitary extract which is to be employed for its anti-diuretic effect should be assayed for this activity by an approved method such as that devised by Burn.

Summary

(1) Sixteen different samples of commercial pituitary extracts were assayed both for their anti-diuretic and for their oxytocic potencies.

(2) The anti-diuretic potency was determined by the rat method devised by Burn. The accuracy of this method has been investigated by means of duplicate assays, which indicate an average experimental error of not more than 10 per cent.

(3) In eleven of the samples the difference between the two potencies was greater than the combined average experimental error of the two methods. In one sample the anti-diuretic potency was nearly two and a half times the oxytocic potency. Only in five out of sixteen samples was the agreement between the two activities satisfactory.

(4) In commercial pituitary extracts supplied as containing 10 units per c.c., the variation in anti-diuretic potency may be as large as 400 per cent.

(5) The oxytocic activity of a pituitary extract is not a safe guide to its anti-diuretic potency. Extracts which are to be employed for the anti-diuretic effect must be assayed for this activity.

Discussion

Mr. Bennett read a letter from Dr. Underhill in which he commented on Mr. Wokes's paper. Dr. Underhill wrote that he felt inclined to emphasise the agreement between the assays rather than the difference. He thought Mr. Wokes was rather optimistic in his

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estimation of the error of the oxytocic activity. The error of a single test might be 10 per cent., but a repetition of the test on a different uterus might give a result differing by more than 10 per cent. from the previous test, that also having its error of 10 per cent. He thought the agreement between the two methods indicated that the great majority of commercial extracts showed equivalence between their oxytocic and antidiuretic potencies. It would be of interest to investigate the cause of the relatively high antidiuretic potency of extract No. 13, since it might lead to a method for the preparation of a highly active antidiuretic extract. He would like to ask Mr. Wokes if any estimations of the pressor principles had been carried out on this extract. It was usually stated that the pressor and antidiuretic principles accompanied each other, if they were not identical. He asked if extract No. 13 was relatively high in pressor potency.

Mr. BOYES made acknowledgment on behalf of the author.

The next paper (also read by Mr. Boyes) was on

The Protein Content of Commercial Pituitary Extracts

By FRANK WOKES, B.Sc. F.I.C., PH.C.

[ABSTRACT]

IN a report by Professor Bijlsma made in 1928 to the International Committee on Biological Standardisation, it is stated that the oxytocic value of pituitary extract may be decreased by as much as 30 per cent. by the presence of protein in unduly large amount, whereas the pressor and antidiuretic potencies appear to be unimpaired. The protein content of pituitary extracts is usually much too small to be estimated by ordinary methods, most samples containing less than 1 mgm. of nitrogen per c.c. The micrometric method adopted consisted in measuring 0.4 c.c. of pituitary extract in a syringe permitting only some 2 per cent. error, and heating this until clear with a mixture of concentrated sulphuric acid, potassium sulphate and copper sulphate. The heating is continued for another fifteen or twenty minutes. After making alkaline with sodium hydroxide, the ammonia is distilled into excess of $N/70$ sulphuric acid, of which 10 c.c. is usually sufficient. Owing to high dilution as much as 0.11 c.c. of $N/70$ sodium hydroxide solution is required in the back titration to effect the complete change of the methyl red used as indicator. This introduces a possible error of 10 per cent., as the alkali reading is sometimes under 1 c.c. Therefore it became necessary to titrate to a PH value of 5.5 by adding 30 c.c. of standard buffer solution. By adding alkali in amounts of about 0.01 c.c. and careful matching of colour with that of standard buffer it was possible to estimate less than 0.5 mgm. of total nitrogen with an error of about 2 per cent. The protein content of fourteen different commercial pituitary extracts (estimated in terms of total nitrogen) is given in Table I:—

TABLE I

NITROGEN CONTENT AND OXYTOCIC ACTIVITY OF COMMERCIAL PITUITARY EXTRACTS

Extract No.	Total nitrogen (mgm. per c.c.)	Oxytocic activity (units per c.c.)	Total nitrogen per oxytocic unit (mgm.)
8	0.26	7.4	0.035
18	0.27	12.5	0.022
20	0.31	11.4	0.031
7	0.34	9.0	0.038
14	0.39	14.0	0.028
16	0.41	7.0	0.059
15	0.49	10.1	0.049
19	0.54	12.1	0.450
12	0.65	11.0	0.059
10	0.67	17.5	0.041
9	0.95	20.0	0.048
13	1.13	13.0	0.087
5	1.21	18.0	0.068
11	1.76	15.5	0.114
Standard	0.26	10.0	0.026

The wide variation of from 0.26 to 1.76 mgm. of total nitrogen per c.c. is equivalent to a range of some 680 per cent., which cannot be explained by differences in activities or loss of activity by storage, since the extracts were all freshly made. The oxytocic activity ranged from 7 to 20 units, and the corresponding protein content varied from 0.022 to 0.114 mgm. of total nitrogen per oxytocic unit. Thus there may be five times as much protein per given oxytocic dose in one sample as compared with that present in the same dose of another. Table II shows that similar discrepancies exist between antidiuretic activity and protein content, the range being nearly 600 per cent:—

TABLE II

NITROGEN CONTENT AND ANTIDIURETIC ACTIVITY OF COMMERCIAL PITUITARY EXTRACTS

Extract No.	Total nitrogen (mgm. per c.c.)	Antidiuretic activity (units per c.c.)	Total nitrogen per antidiuretic unit (mgm.)
8	0.26	11.6	0.022
18	0.27	11.1	0.024
20	0.31	6.2	0.050
7	0.34	5.7	0.060
14	0.39	11.2	0.035
16	0.41	4.1	0.10
15	0.49	10.6	0.046
19	0.54	6.6	0.082
12	0.65	14.6	0.044
10	0.67	14.6	0.046
9	0.95	27.0	0.035
13	1.13	31.5	0.036
5	1.21	22.0	0.055
11	1.76	13.5	0.130
Standard	0.26	10.0	0.026

Such wide variations in the protein content of pituitary extracts should not occur, especially as there is reason to believe that excessive protein causes pain after injection. In addition the high protein content indicates considerable loss of activity during manufacture. By freezing the fresh glands immediately after collection it is possible to prepare pituitary extract containing less than 0.026 mgm. of total nitrogen per oxytocic or antidiuretic unit. By removal of inert protein the ratio can be reduced to less than 0.001 mgm. of total nitrogen per oxytocic unit. There is little variation in activity per unit weight of posterior lobe of pituitary gland when fresh, and the protein content should be fairly constant and run parallel with the activity. Hence the nitrogen content per unit of activity can be taken as a guide to efficiency in manufacture. The higher this figure, the more of the active principle that has been destroyed. Nine out of the fourteen commercial extracts give figures not exceeding 0.05 mgm. per unit. The results on extract No. 11 indicate a loss of from two-thirds to four-fifths of the initial activity. In the same manner extract No. 13 has lost one-half to two-thirds of available activity, the PH value of 5.4 being another indication of lack of efficiency during manufacture. It is clear that certain pituitary extracts have been prepared in such a manner that there has been considerable loss of activity. This leads to unnecessarily high protein content. It is suggested that makers should aim at securing a figure below 0.05 mgm. of total nitrogen per oxytocic unit.

Table III contains results upon fifteen extracts (including one made from standard pituitary powder) in which the ratio of oxytocic activity to antidiuretic activity is compared with content of total nitrogen. The evidence does not confirm the hypothesis of Bijlsma and van Esveld that the largest quantity of protein is found in extracts showing the closest agreement between oxytocic, antidiuretic, and pressor activities. There appears to be fairly good correlation in some extracts giving a ratio higher than unity (e.g., Nos. 8, 9, 12 and 5). Extract No. 13 supplies a contradictory figure. The evidence is against the hypothesis in extracts in which the antidiuretic activity is less than the oxytocic potency (e.g., Nos. 14, 7 and 16).

TABLE III

NITROGEN CONTENT AND RATIO BETWEEN ANTIDIURETIC AND OXYTOCIC ACTIVITIES OF COMMERCIAL PITUITARY EXTRACTS

Extract No.	Ratio of oxytocic to antidiuretic activity	Total nitrogen	
		Per oxytocic unit	Per antidiuretic unit
13	1 : 2.44	0.087	0.036
8	1 : 1.57	0.035	0.022
9	1 : 1.35	0.048	0.035
12	1 : 1.31	0.059	0.044
19	1 : 1.29	0.045	0.082
5	1 : 1.22	0.068	0.055
18	1 : 1.12	0.022	0.024
15	1 : 1.05	0.049	0.046
Standard	1 : 1.00	0.026	0.026
10	1 : 0.88	0.041	0.046
11	1 : 0.87	0.114	0.130
14	1 : 0.80	0.028	0.035
7	1 : 0.64	0.038	0.060
16	1 : 0.59	0.059	0.10
20	1 : 0.56	0.031	0.50

DISCUSSION

Mr. BENNETT said he had on this paper also some comments from his colleague, Dr. Underhill. The latter pointed out that variation in protein content may be due to differences in manufacture. Mr. Wokes had assumed that every manufacturer makes his extract by the same method. This may be so now, but was not so a year or two ago. It is possible that variations in nitrogen content indicate variations in methods of manufacture. A high nitrogen content would then indicate a bad method of manufacture rather than carelessness in freezing the glands before extraction.

Mr. EVERS remarked that there were better methods of determination of nitrogen than the one mentioned in the paper.

The next paper was:—

The Volumetric Assay of Chlorates

1.—Reduction by Hydriodic Acid in the Presence of Ferrous Sulphate

By G. J. W. FERREY, B.Sc., A.I.C.

[ABSTRACT]

THE assay process recommended by the Pharmaceutical Chemistry Subcommittee for inclusion in the B.P. monograph on potassium chlorate was worked out by Harvey, who studied the reduction of chlorates by hydriodic acid in the presence of ferrous sulphate as catalyst. As the result of a large number of experiments, Harvey came to the conclusion that this reduction is incomplete, and that, under the conditions laid down in his method, results were returned about 1 per cent. below theory. Since Harvey's method has been recommended for adoption by the B.P. in its entirety, without any modification,* it was of obvious interest, in view of the requirement of 99 per cent. purity for potassium chlorate (as determined by this method), to discover whether Harvey's conclusion was, in fact, correct, or whether, on the other hand, the process was capable of returning theoretical results.

For this purpose, two samples of pure potassium chlorate were prepared from two different lots of B.P. potassium chlorate by recrystallisation from hot water, and drying at 100° C. for several hours. On testing for nitrates, perchlorates, chlorides, sulphates, calcium and iron, no reactions were obtained. When assayed by evaporation with dilute hydrochloric acid followed by gentle ignition and weighing of the chloride residue, results of 100.0 and 100.1 per cent. were obtained. The $N/10$ sodium thiosulphate solutions used in this work were prepared from A.R. sodium thiosulphate, and checked against both iodine and potassium dichromate of A.R. quality. All volumetric apparatus had been carefully calibrated, and the titrations were carried out in as standard a method as possible. Ten mils of a solution containing 0.08 gm. of potassium chlorate is heated in a stoppered bottle at about 50° C. for twenty minutes with 25 mils of acid solution of ferrous sulphate and 5 gm. of potassium iodide. After cooling, 50 mils of water is added and the liberated iodine titrated with $N/10$ thiosulphate. A blank experiment on 10 mils of water is carried out simultaneously. The first six results in Table I show that, within the limits of experimental error, Harvey's method does, in fact, return theoretical results even when the temperature of reaction is as low as, but not below, 30° C.

TABLE I

Potassium iodide 5 gm. Ferrous sulphate $N/10$.

Expt. No.	Strength of sulphuric acid	Temp. °C	Time minutes	$KClO_3$ taken gm.	$N/10$ thiosulphate required mils	$N/10$ thiosulphate (theor.) mils	$KClO_3$ per cent.
1	$3N$	50	20	0.08021	39.3	39.28	100.1
2	,,	45	,,	0.08126	39.8	39.79	100.0
3	,,	40	,,	0.08021	39.25	39.28	99.9
4	,,	30	,,	,,	39.25	,,	99.9
5	,,	25	,,	00.8086	38.05	39.59	96.1
6	,,	15	,,	,,	31.45	,,	79.4
7	,,	25	30	,,	39.55	,,	99.9
8	,,	19	,,	,,	38.1	,,	96.2
9	,,	15	,,	,,	34.95	,,	88.3
10	,,	19	60	,,	39.55	,,	99.9
11	,,	15	,,	,,	38.85	,,	98.1
12	,,	10	,,	,,	37.25	,,	94.1
13	$4N$	30	20	,,	39.55	,,	99.9
14	,,	25	,,	,,	39.3	,,	99.3
15	,,	30	30	,,	39.6	,,	100.0
16	,,	25	,,	,,	39.6	,,	100.0
17	,,	20	,,	,,	39.2	,,	99.0
18	,,	15	,,	,,	37.95	,,	95.8
19	,,	14	60	,,	39.6	,,	100.0
20	,,	14	,,	0.08044	39.35	39.39	99.9

It occurred to the writer that the method might be simplified and a possible source of error removed if, by suitable adjustment of the conditions of experiment, the necessity for heating the reaction mixture could be avoided. With this object in view, the experiments were continued, reducing the temperature as low as 13° C. and increasing the time of reaction to sixty minutes. Using an acid solution of ferrous sulphate of Harvey's strength ($N/10$ in reducing power and $3N$ in acidity) it was found that low results were obtained at 15° C. even after sixty minutes' reaction (experiments 7 to 11). With an increase in sulphuric acid in the reagent from $3N$ to $4N$, theoretical results were obtained in sixty minutes at 14° C., but not in the shorter periods of time examined (experiments 13 to 20). Following a suggestion in the work of Green, that ferrous and ferric salts catalyse the reaction in proportion to their concentration, the strength of ferrous sulphate in the acid solution of ferrous sulphate was increased from $N/10$ to $N/5$ (Table II). When the acid strength was $3N$, the reaction was complete in sixty minutes, but not in forty minutes at 13° C. (experiments 21 to 27), but by increasing the acid to $4N$, theoretical results were obtained in thirty minutes at 13° C. (experiments 32 to 34). Increase in the strength of acid to $6N$ presented no advantage.

TABLE II

Potassium iodide 5 gm. Ferrous sulphate $N/5$.

Expt. No.	Strength of sulphuric acid	Temp. °C	Time minutes	$KClO_3$ taken gm.	$N/10$ thiosulphate required mils	$N/10$ thiosulphate (theor.) mils	$KClO_3$ per cent.
21	$3N$	20	10	0.08044	33.75	39.39	85.7
22	,,	,,	20	,,	38.75	,,	98.4
23	,,	,,	30	,,	39.3	,,	99.8
24	,,	,,	40	,,	39.4	,,	100.0
25	,,	13	30	,,	38.3	,,	97.2
26	,,	,,	40	,,	38.9	,,	98.7
27	,,	,,	60	,,	39.4	,,	100.0
28	$6N$	,,	20	,,	39.25	,,	99.6
29	,,	,,	30	,,	39.4	,,	100.0
30	,,	,,	40	,,	39.35	,,	99.9
31	,,	,,	60	,,	39.4	,,	100.0
32	$4N$	,,	30	,,	39.4	,,	100.0
33	,,	,,	,,	0.08794	43.0	43.06	99.9
34	,,	,,	,,	,,	43.1	,,	100.1

* In the Subcommittee's report, the composition of the acid solution of ferrous sulphate is not given. It was assumed that as Harvey's method had been adopted, this solution would have the composition recommended by Harvey—viz., $N/10$ in reducing power and $3N$ in acidity.

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The following method is therefore suggested as being more convenient than the method suggested for inclusion in the B.P., and equally accurate:—10 mils of a solution containing 0.08 gm. of potassium chlorate is pipetted into a stoppered bottle of about 300 mils capacity. Five gm. of potassium iodide is added, followed by 25 mils of an acid solution of ferrous sulphate, $N/5$ in reducing power and $4N$ in acidity (i.e., 55.6 gm. of ferrous sulphate and 200 gm. of concentrated sulphuric acid per litre). The mixture is allowed to stand for not less than thirty minutes at room temperature (not below 13° C.), diluted with 70 mils of water, and titrated with $N/10$ thiosulphate. A blank test on 10 mils of water is carried out under the same conditions. This blank test should be protected from the light.

Summary

It is shown that at a temperature above 30° C. the reduction of chlorates by hydriodic acid in the presence of ferrous sulphate as catalyst is quantitative under the conditions of the proposed B.P. assay method. By increasing the ferrous sulphate and sulphuric acid in the acid solution of ferrous sulphate from $N/10$ and $3N$ to $N/5$ and $4N$ respectively, and the time of reaction from twenty to thirty minutes, the reaction is quantitative at a temperature as low as 13° C. Other conditions under which the reaction is quantitative are indicated.

From the analytical laboratory of James Woolley, Sons & Co., Ltd.

Discussion

Mr. Corfield said he felt that all the iodometric methods were objectionable. They could be applied to a pure substance, but failed when that substance contained small quantities of impurities.

Dr. Hampshire asked if there was any reason for varying the conditions between the blank and the main test.

Mr. Ferrey briefly replied. The next paper, by the same author, was:—

II.—Reduction by Hydriodic Acid in the Presence of Strong Hydrochloric Acid

By G. J. W. Ferrey, B.Sc., A.I.C.

[Abstract]

The reaction between chloric acid and hydriodic acid has been comparatively neglected by analysts owing to the high concentration of mineral acid introducing complications. The idea appears to be prevalent that lengthy periods of time and/or high temperatures are necessary to ensure completion of the reaction, and that the error from the secondary reaction between atmospheric oxygen and hydriodic acid may attain considerable proportions. The iodine liberated by atmospheric oxygen is derived from the excess of potassium iodide beyond that theoretically required by chlorate. However, the error is less than 0.04 per cent. when the time of reaction is limited to one minute. Contrary to text-book impressions, the reaction between chloric and hydriodic acids is very rapid providing the concentration of hydrochloric acid is $7.5N$ or greater. It is complete without heating in one minute when 1.5 of the theoretical amount of potassium iodide is present, and in five minutes with the molecular proportion of potassium iodide. The presence of potassium nitrate (up to 5 per cent.) does not interfere with accuracy of assay. Since the reaction is not reversible, any desired amount of water may be added before titration.

The details of the method are as follows:—

Dissolve about 0.8 gm. of potassium chlorate, accurately weighed, in water and make up to 100 mils. Pipette 10 mils into a stoppered bottle of about 300 mils capacity. Add 1 gm. of potassium iodide, allow to dissolve, and then add 30 mils of concentrated hydrochloric acid. Quickly replace the stopper (which should be moistened with a drop of potassium iodide solution) and allow to stand for one minute, during the last fifteen seconds of which the bottle is slowly rotated under the tap to cool it slightly and prevent loss on removing the stopper. Add 120 mils of water and titrate with $N/10$ thiosulphate. Starch may be used as indicator.

The following table gives the results of titration of 10 mils of chlorate solution after adding specified amount of potassium iodide and 30 mils of concentrated hydrochloric acid:—

Time of reaction minutes	Potassium iodide gm.	Potassium chlorate taken gm.	$N/10$ thiosulphate required mils	$N/10$ thiosulphate (theor.) mils	$KClO_3$ per cent.
0.5	1.0	0.08007	35.85	39.21	91.4
1	,,	,,	39.23*	,,	100.05
2	,,	,,	39.18*	,,	99.93
5	,,	,,	39.24*	,,	100.08
5	0.67	0.08021	39.30	39.28	100.05
1	1.0	0.09023	44.14	44.18	99.90
1	,,	0.08021 (*a*)	39.35	39.28	100.17
5	,,	0.08021 (*b*)	39.35	,,	100.17

* = mean of three titrations.
(*a*) = *plus* 0.0040 gm. KNO_3 (= 5 per cent. approx.)
(*b*) = *plus* 0.0016 gm. KNO_3 (= 2 per cent. approx.)

Summary

(1) It is shown that, contrary to the impression to be gained from the text-books, the reaction between chloric and hydriodic acids is very rapid provided the concentration of hydrochloric acid present be $7.5N$ or greater.

(2) The reaction goes to completion in five minutes without heating when only the theoretical amount of potassium iodide is present, and in one minute in the presence of approximately 1.5, the theoretical quantity.

(3) When the time of reaction is limited to one minute, the error involved through the action of atmospheric oxygen is less than 0.04 per cent.

(4) The presence of as much as 5 per cent. of potassium nitrate in potassium chlorate does not interfere with the accuracy of the assay.

The work involved in this communication was carried out in the analytical laboratory of James Woolley, Sons & Co., Ltd., Manchester.

There was no discussion.

The next paper was:—

Strong Solution of Lead Subacetate

By Charles Morton, B.Sc.

[Abstract]

In this paper a partial investigation is made at 25° C. of the ternary system PbO—$Pb(C_2H_3O_2)_2$—H_2O by phase-rule methods with a view to arriving at the composition of Goulard's extract. The conclusion is deduced that, in the official strong solution of lead subacetate, the composition of the solute varies continuously with the relative proportions of the three components present in the reaction mixture. Lead oxide and lead subacetate are present in molecular proportions approximating that of the monoxyacetate (assumed by various investigators as being in equilibrium with its saturated solution); but the solution must be regarded as a mixture and not a pure compound, since it is not possible to recrystallise the solid residue from distilled water without decomposition taking place. The results, over the restricted range studied, indicate that the solid phase consists of the dioxyacetate $2PbO,Pb(C_2H_3O_2)_2,4H_2O$. The experimental data indicate that at equilibrium (prior to dilution) the liquid phase in the pharmacopœial reaction mixture contains the equivalent of 12.62 per cent. of basic lead and 16.97 per cent. of normal acetate, corresponding to a molecular ratio

$$PbO : Pb(C_2H_3O_2)_2 = 1.08 : 1$$

During the subsequent washing of the solid phase (on the filter) with distilled water as in the pharmacopœial method, hydrolysis takes place and the filtrate becomes richer in acetic acid. In the diluted solution the degree

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of hydrolysis varies with the mode of preparation. Constancy of composition is not maintained over even a limited range, as would be the case if the equilibrium mixture consisted of solution of monoxyacetate in equilibrium with its solid.

It is suggested that part of the basic lead is present in colloidal solution. This explains the anomaly of Goulard's extract showing considerable sensitivity to electrolytes and yet remaining clear when the "precipitation PH" of lead hydroxide is exceeded. The behaviour of the solution of lead subacetate in forming an opaque jelly with mucilage of acacia and the precipitates obtained with many vegetable substances agree with these resulting from adsorption and entrainment rather than the precipitation of definite chemical compounds.

Summary

(1) In the preparation of Goulard's extract the residue removed by filtration consists of the pure dioxyacetate

$$2PbO,Pb(C_2H_3O_2)_2,4H_2O.$$

The solution is a ternary mixture in equilibrium with the dioxyacetate as solid phase. There appears to be no evidence of the existence of the supposed monoxyacetate

$$Pb(OH)_2,Pb(C_2H_3O_2)_2$$

either as solute or solid phase. These conclusions are based on a partial investigation (by phase-rule methods) of the ternary system $PbO—Pb(C_2H_3O_2)_2—H_2O$ at 25° C.

(2) The low lead-ion concentration of Goulard's extract and its sensitivity towards electrolytes, taken in conjunction with the fact that the solution is stable, although the "precipitation PH" of lead hydroxide is exceeded, suggest that part of the basic lead is present in colloidal solution.

This paper was taken as read in the absence of the author.

The CHAIRMAN expressed the thanks of the members.

The next paper was:—

The Origins of British Pharmacy

By J. P. GILMOUR, M.P.S.

[ABSTRACT]

CONTEMPORARY civilisation is concerned with only so much of the bygone as can reasonably be inferred materially and morally to influence the present, and only with so much of the future as may be presumed to be affected by the present (W. K. Clifford). In this instance, what is true of the whole, holds good for the part. For an adequate insight into, and enlightened management of all branches of the pharmaceutical profession, and, in particular, of its scientific and technical sides, some acquaintance with the annals of pharmacy is prerequisite.

The historic study of British pharmacy is culpably neglected, and, for the most part, the literature of the subject is quite unworthy of it. Bell and Redwood's "Progress of Pharmacy" is serviceable up to a point, but at best is a mere fragment, and for the rest we have to search through the periodical pharmaceutical Press for sporadic fugitive articles on prominent personalities or memorable events in pharmacy, notably in addresses by former presidents or chairmen of this Conference. The International Congress of the History of Medicine, which held its third meeting in London in 1922, on that occasion received an historic sketch of British pharmacy by the author. There is a European Society for the History of Pharmacy, which has issued monographs on Scheele and the "Star Pharmacy" at Nürnberg, a French Society with an official organ in which biographical sketches of the early apothecaries have appeared; and there is an active and productive history of pharmacy section of the annual general meeting of the American Pharmaceutical Association. The advent of a comprehensive and standard work on the history of British pharmacy is long overdue, and a strenuous systematic effort should be made between now and the date of the centenary of the Pharmaceutical Society of Great Britain in 1941 to meet this desideratum.

A critical examination, not only of folk medicine and lore, but also of what is commonly accepted as orthodox medical doctrine and treatment, reveals many survivals of primitive ideas and methods. For example, quite a number of vegetable drugs owe their reputation to the fantastic doctrine of signatures, according to which, if a plant bears the stigmata of a disease, e.g., the bulbils on the roots of the lesser celandine, which resemble piles, it is the preordained remedy for that disease. Within the historic period, as among the great civilisations of the ancient world of Assyria, Babylonia, India, Egypt, Greece and Rome, Lenormant has shown that in Mesopotamia medicine and magic were almost correlatives. Thirty per cent. of the drugs in the Pharmacopœia of 1914 were known to and used in Egyptian hieratic medical practice, and 37 per cent. of our official materia medica was in the armamentarium of the Greeks in the age of Hippocrates, and 50 per cent. was employed by the Arabic-speaking physicians between the sixth and tenth centuries. The Romans borrowed their medical science and art almost entirely from the Greeks, and debased rather than improved what they borrowed. Their medical knowledge was carried by them into the countries which they invaded or conquered, but made no permanent impression on the barbarous inhabitants of Gaul and Britain. The priests of the Druids in both countries were also medicine men, and in addition to the mystic mistletoe which was venerated as a panacea, the principal drugs in their materia medica were selago (fir clubmoss), samolus (brookweed or water pimpernel), verbena and oak. Later still the Angles, Jutes and other so-called Teutonic invaders and settlers brought with them from the Continent the medical lore which had much in common with the earlier Druidical system. In Saxon times, as described in Cockayne's "Saxon Leechdoms, Wart Cunning and Star Craft," the preparation and administration of drugs were accompanied by incantations and conjurations and other rites which persisted down to the period of the age of the herbalists.

Apothecaries' Shops

From the booth in the bazaar in the Far and Near East, through Italy and Spain, there evolved those apothecaries' shops "according to the custom of the Arabs," which began to make their appearance in Europe in the eleventh and twelfth centuries. Among the more notable early pharmacies were the pharmacy of the Small Brethren in Dobremik, Bohemia (1317), two pharmacies in Old Prague, founded in 1332 and 1337 respectively, and the better-known examples at Dijon and Nürnberg. Apothecaries, who were minor medical practitioners specialising in the preparation and compounding of drugs, came from the Continent to England and Scotland towards the end of the thirteenth and the beginning of the fourteenth century. In Edinburgh, between 1436 and 1460, in the reign of James IV, Master Stephane, an apothecary to that monarch, who was a liberal patron of medicine and an ardent amateur practitioner of it, was, by royal command, given the tenancy of a booth in Edinburgh for the sale of "his material and spicery." Between 1500 and 1600 apothecaries, whose principal business was to sell and dispense drugs under Court patronage, had shops in the chief Scottish towns. In Glasgow, in 1599, when the Faculty of Physicians there was erected by a Royal Charter granted by James VI, there were placed on the first register several "farmatians," a vernacular variant of the French title "Pharmacien," this being one of the many assimilations to French idioms and modes during the Auld Alliance between France and Scotland. In England, down to the end of the sixteenth century, such drugs and medi-

cines as were then in vogue were sold largely by grocers and spicers, but during the sixteenth century the teaching of Paracelsus as to the superiority of chemical compounds in the treatment of disease had made such headway that a new class of producers and distributors came into being, namely, the "chymists."

It was about this time that some of the grocers found it profitable to specialise in the stocking and sale of drugs and so came into competition with the apothecaries. At first, probably to join forces, the apothecaries became incorporated with the grocers' company, but in 1617, under a charter from James I, the apothecaries formed a separate society, and thenceforward the competition and rivalry was between the physicians and apothecaries, with at time open warfare. Later friction arose between the apothecaries and the emerging and growing class of chemists and druggists, who, after organising from time to time for emergency purposes in defence of their rights, in 1841 founded the Pharmaceutical Society of Great Britain, the history of which lies beyond the scope of this paper.

The Beginnings of Pharmacy Law

In England the first measure of statutory control of the practice of medicine, entitled "An Act for Appointing Physicians and Surgeons," was passed in 1511. In 1518, mainly on the initiative of Linacre, the Royal College of Physicians (London) was founded, and in 1540 powers were given to it "to search, view and see" the apothecaries' "wares, drugs and stuffs." By an Act of 1553 the College was authorised to "survey and examine the stocks of apothecaries, druggists, distellers and sellers of waters and oils, and preparers of chemical medicines." In Scotland, as early as 1450, under an Act of James II, all persons were forbidden under pain of treason to bring home poison for any use by which any Christian man or woman could take harm. Under the Medical Charter of 1599 for Glasgow, a prototype of our now familiar poisons schedule was introduced. This provided that none should sell rat poison, arsenic or corrosive sublimate except the registered apothecaries, who were required to demand security from purchasers to cover risk of injury to man or beast, due to the misuse of these poisons. In Scotland, between 1649-61, the eventful years of the Great Civil War, the Commonwealth and the Restoration, it is on record that each town in Fifeshire (The Kingdom) was provided with its physician or apothecary. Under an Order (1621) of James the Sixth of Scotland and the First of England, an official national price list of drugs and medicines was issued, but whether it was ever enforced is a detail upon which history is silent. This order prohibited the sale to the public of "any drogues of dangerous quality, such as antimony, opium, scammony, arsenic, mercury, or any narcotic, cathartic or purging medicament." In 1685 the Scottish Parliament ratified a decree of the Lords of Session (the Law Lords) enacting that surgery and pharmacy should be distinct occupations, not to be followed by one and the same person. In 1695 a regulation was issued by the Surgeon Apothecaries of Edinburgh that no person could lawfully practise pharmacy in the city unless licensed. In 1737 there was a wholesale drug house in Edinburgh with the high-sounding trade name of the "Chymicall Laboratory, of Edinburgh," from which Dr. William Cullen, of Hamilton, afterwards the famous Professor of Physic in Edinburgh University, obtained his supplies of drugs.

Pharmacopœias

A pharmacopœia is the canonical criterion for pharmacy, but in the production of the early European pharmacopœias, pharmacists as such had very little voice or part. In an article on "The Evolution of Our Pharmacopœia," Professor Stockman has pointed out that much of the material for the pioneer pharmacopœias was derived from collections of approved or favourite prescriptions, or from manuals of recipes, written expressly for apothecaries. The first official pharmacopœia to bear the *imprimatur* of a University was the "Antidotarium Florentinum" (Florence, 1498). The first London Pharmacopœia (1618) did not differ materially from the worst Continental models, which it had almost servilely copied. The first Edinburgh Pharmacopœia (1699) enumerated 900 simples, and included many mediæval abominations and monstrosities, of which it was gradually purged in subsequent issues, so that in its final issue the number of efficacious drugs had been reduced to 300. The first Dublin Pharmacopœia appeared in 1807, and in pursuance of the Medical Act of 1858 the first British Pharmacopœia was published in 1864. The apothecaries who were licentiates of the Society of Apothecaries had some share in the production of each national pharmacopœia and of the first British Pharmacopœia, but chemists and druggists, if consulted at all, were referred to only to help the medical compilers out of some difficulty or as an act of condescension. Nevertheless, there were already present the seminal elements of recent developments in which pharmacy has received more adequate and equitable recognition and treatment in the work of pharmacopœial revision.

Pharmaceutical Education, Science and Research

Academic or any systematic teaching and training in medicine and pharmacy are of comparatively recent origin. In Scotland not until 1768 was the first Professor of Materia Medica appointed at Edinburgh University. In 1794 the surgeon apothecaries in that city instituted a course of lectures in chemistry which included demonstrations of pharmaceutical processes. A chemical laboratory was instituted in Glasgow University in 1747, at the instance of Joseph Black, whose researches on the "mild alkalis" and discovery of carbon dioxide are among the classic discoveries of chemical science. It was the Pharmaceutical Society that opened in its School of Pharmacy in London the first chemical laboratory in this country for the instruction of students in practical work in the science which has since become so dominant a force in modern civilisation.

Pharmaceutical science is based upon and pervaded by all the physical sciences, but more especially by botany, chemistry and physics. For its botanical ancestry we have to go back to Diodorus, Theophrastus, Galen and Avicenna; the classic herbalists on the Continent and in England; the physic gardens of the English herbalists and Society of Apothecaries, and also those laid out and maintained in Edinburgh and Glasgow. In the former city a beginning in 1664 with the systematic cultivation of medicinal plants for instruction in materia medica was made, and *longo intervallo* Glasgow followed in 1704, when a part of the Old College grounds, described in Scott's "Rob Roy," was set aside for the purpose. Again, it was the Pharmaceutical Society which in 1842, with Anthony Todd Thomson as professor, instituted the first systematic course in botany for students of pharmacy. Chemistry was, so to speak, sublimated from alchemy. In England it was John Mayow, Robert Boyle, Joseph Black, Priestly, Cavendish, Dalton and Davy who placed it on a scientific basis. In the late eighteenth and early nineteenth century, many of the more important discoveries, for example, the isolation of alkaloids, were made by workers who had commenced life as pharmacists or had received a pharmaceutical training.

Here is a promising field for exploitation and cultivation for that future historian of British or world pharmacy for whom we are waiting. This Conference stands for and has consistently sought to develop and advance pharmaceutical research. Before any piece of research work can safely be entered upon, the would-be investigator, if he is to avoid the risk of having been forestalled, must read up the literature of the relevant subject. Similariy, if there is to be a correct orientation and interpretation in other pharmaceutical interests and issues, there must be at least a reconnaissance of the ground to be traversed. For these

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reasons it would be an undoubted advantage to pharmacy, particularly on the scientific, technical and professional sides, if the Conference gave some encouragement to the study of the history of pharmacy by recommending it as a subject for research and communication to its proceedings. [The author appended a bibliography.]

Discussion

Mr. Fouracre said he always thought that the use of aspirin originated with the Romans, who went to the damp parts where the willows grew and used the bark. From that beginning the preparation of aspirin developed.

Mr. Gilmour, in reply, said he did not think that Mr. Fouracre's example had any real historical foundation. The Romans in general did nothing to add to medical knowledge.

The next paper was:—

The Volumetric Determination of Mercuric Chloride by Rupp's Method

By Harry Brindle, B.Sc., F.I.C., Ph.C.

[Abstract]

Rupp's method for the volumetric determination of mercuric chloride has been adopted as the official process of the British Pharmacopœia, 1932. In view of the fact that the process has been subjected to much adverse criticism the author has examined the method with the object of checking its accuracy. In the course of the work it was discovered that the chief drawback to the process, i.e., the difficulty in dissolving the precipitated mercury in the iodine solution, could be overcome by very simple means. Briefly stated, the process consists in dissolving about 0.3 gm. of mercuric chloride in 10 mils of potassium iodide solution and 75 mils of water, and adding 15 mils of sodium hydroxide solution and 3 mils of formaldehyde diluted with 10 mils of water. The mixture is shaken vigorously for two minutes, 20 mils of acetic acid added, and then 35 mils of $N/10$ iodine. The mixture is then shaken for ten minutes or until the mercury is completely dissolved. The excess of iodine is then titrated with $N/10$ sodium thiosulphate.

An ordinary sample of mercuric chloride supplied as of "B.P." quality was used for all the tests. The sample was well powdered and mixed in a mortar to ensure uniformity. Assayed gravimetrically by electrolytic methods, using a platinum gauge cathode both stationary and rotated, the following results were obtained:—(*a*) 99.63 per cent. of $HgCl_2$; (*b*) 99.61 per cent. of $HgCl_2$. The mercuric chloride used, therefore, contained 99.62 per cent. of $HgCl_2$, the second decimal place being approximately correct. Early experiments proved that the criticism that the alkaline formaldehyde did not completely reduce the mercuric chloride to the metal were not justified, at least when the above stated conditions were complied with. Accurate results were obtained when the formaldehyde was shaken with the mercuric chloride for two minutes. Considerable difficulty was experienced in dissolving the precipitated mercury in the iodine solution. More than ten minutes' continuous shaking was frequently required, although sometimes solution was complete in less than this time. The chief objection to the process was, however, that it was impossible to decide when all the mercury had been dissolved, and the only way to obtain a result which could be relied upon was to continue shaking for a period much longer than ten minutes, say twenty minutes or so. In the absence of a shaking machine this would prove very tedious, and attention was first directed to this stage of the process with the object of overcoming the difficulty. The addition of mucilage of acacia as recommended by Vieböck and Brecher was rejected, since it retarded the reduction of the mercuric chloride by the alkaline formaldehyde. When 30 per cent. of glycerin was added to the liquid only 60 per cent. of the mercuric chloride was reduced after four minutes' continuous shaking. Since it was practically certain that other "protective" substances added with the object of obtaining the mercury in a very finely divided form would act similarly it was decided to abandon this line of attack. Alcohol, chloroform and ether were tried without greatly affecting the rate of solution, but, as the following results show, complete success was attained by the addition of a few millilitres of a mixture of chlorform 1 vol. and ether 2 vol. In each case the addition was made immediately following the addition of the iodine solution. In the earlier experiments the temperature of the liquid was not taken, although it was later found that it had a considerable effect.

No. of experiment	Additional liquid added	Temperature	Time of shaking	Result
1	Nil	15° C.	7	98.63
2	Nil	15° C.	5	96.70
3	Nil	—	1	87.07
4	5 mils chloroform	—	½	87.53
5	5 ,, ,,	25° C.	½	98.88
6	5 ,, ether	—	1	99.12
7	5 ,, ,,	—	1	98.76
8	20 ,, ,,	—	½	96.80
9	36 ,, ,,	25° C.	½	96.56
10	5 ,, Chloroform 1 vol. Ether 2 vols.	24° C.	½	99.60
11	5 ,, ,,	15° C.	½	99.57
12	5 ,, ,,	15° C.	1	99.57
13	5 ,, ,,	—	¼	89.00
14	5 ,, ,,	—	¼	97.47

Even when working rapidly the reaction was nearly always found to be complete after half a minute's shaking; there is therefore ample latitude in recommending that the excess of iodine be titrated after shaking for one minute with 5 mils of a mixture of 2 vol. of ether with 1 vol. of chloroform. The ether and chloroform used should be of B.P. quality. Ether containing peroxides gives a low result, due to the liberation of iodine from the potassium iodide.

Reduction of Mercuric Chloride to Metallic Mercury

As mentioned above, several workers have stated that this is incomplete. It was considered advisable to vary the conditions with the object of obtaining a knowledge of the conditions necessary for success. It was found that the temperature, time and concentration of alkali all have a considerable effect. The time of shaking recommended for the B.P. 1932 process is two minutes, and no mention is made of the temperature. It follows, therefore, that the temperature of the liquid would be about that of the laboratory, although there is some slight increase, about 2° C., when the caustic soda solution is added. The amount of caustic soda solution is 15 mils, and as the strength is presumably 20 per cent. w/v, the concentration of NaOH in the reaction mixture is about 3 per cent., or rather below normal. In nearly every case chloroform and ether mixture as recommended above was added to facilitate the solution of the mercury in the iodine; when this was not done the liquid was shaken for twenty minutes before titrating the excess of iodine solution. [A table of results is given.] The facts emerging from this table are that the reduction of the mercuric chloride is only complete in the presence of 7.5 mils of sodium hydroxide solution, i.e., in a concentration of about 1.5 per cent. of sodium hydroxide, when the liquid is shaken for two minutes at a temperature exceeding 20° C. If shaken for a longer period, the reaction is complete at lower temperatures. The results of another table given show that reduction is incomplete at low temperatures after 1½ minute's shaking with the full mils, i.e., 3 per cent. concentration of NaOH, but is complete at 8° C. in two minutes. It is unsatisfactory to heat the solution, since it has been shown that at elevated temperatures the alkali reacts with the formaldehyde to produce a substance which reacts with the iodine. It has also been stated that the concentration of the alkali should not exceed 4 per cent.

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SUMMARY

An examination has been made of the volumetric process for the determination of mercuric salts first suggested by Rupp, i.e., reduction to metallic mercury by means of alkaline formaldehyde and the dissolving of the mercury in standard iodine solution. It is shown that the reduction of mercuric chloride is dependent upon the concentration of the alkali, the temperature and the time. Using 0.3 gm. of mercuric chloride and excess of formaldehyde the reduction is complete in less than two minutes at ordinary temperature in the presence of 3 per cent. of sodium hydroxide. The difficulty, not only in dissolving the precipitated mercury in the iodine solution, but also in determining when solution is complete, is overcome by the addition of 5 mils of a mixture of 2 vol. of ether and 1 vol. of chloroform. Solution is then always complete after one minute's shaking, even at temperatures below normal. It is recommended that this addition be always made in carrying out the process, thereby greatly decreasing the time required and increasing the reliability of the results obtained.

From the Pharmaceutical Department, Manchester University.

DISCUSSION

Mr. JONES said he could not quite follow as to how the mercury went into solution.

Mr. POWELL said the author's results had confirmed his (Mr. Powell's) experiments.

Mr. BRINDLE replied.

The next paper was

The Determination of Mercury in Mixtures Containing Solutions of Mercuric Chloride and Vegetable Infusions

By L. MARJORIE MUNDY, PH.C., and CLARICE W. S. RIX

[ABSTRACT]

IN the determination of mercuric chloride, by precipitation of the sulphide, in mixtures containing solution of mercuric chloride and infusion of calumba, considerable disparity of results has been noticed, and to a less marked extent in similar mixtures containing potassium iodide. These differences have been overcome, and the present paper shows how the proportion of mercuric chloride in such mixtures may be determined with a high degree of accuracy. On passing hydrogen sulphide into a mixture containing solution of mercuric chloride and 12.5 per cent. of concentrated infusion of calumba (1-7), no precipitate of mercuric sulphide is obtained. On alternately heating the slightly acidified liquid for a considerable time and resaturating with hydrogen sulphide, either no precipitate or, in other cases, a small and very flocculent one, obviously mixed with an appreciable amount of organic matter, separates. In experiments made with a view to rendering some of the constituents of the infusion insoluble, the liquid was evaporated to dryness on the water bath, the residue taken up in 20 mils of water and 3 mils of hydrochloric acid, allowed to stand overnight and filtered, the filter being washed with 70 mils of water. After reducing the acidity of the resulting solution with ammonia and saturating with hydrogen sulphide, no immediate precipitate was obtained, but on heating on the water bath and again saturating with hydrogen sulphide a very small amount of sulphide, equivalent to about 1.0 per cent. of the solution of mercuric chloride, was thrown down. On again heating and passing hydrogen sulphide for a considerable time, in three subsequent determinations, mercury sulphide corresponding to only 10.5 per cent., 10.7 per cent., and 10.0 per cent. of the solution of mercuric chloride was precipitated. Further experiment showed that on evaporating a control solution of mercuric chloride only, for the same length of time, and treating the residue in the same manner, only a few milligrammes of sulphide were obtained, whereas without previous evaporation, a solution of mercuric chloride gave 100 per cent. of the mercury contained in it. It is evident therefore that mercuric chloride in dilute solution is extremely volatile in steam, and that the presence of the infusion not only hinders the precipitation of the sulphide, but does in some degree reduce the loss from evaporation.

The same method applied to a mixture containing, in addition 2.286 per cent. of potassium iodide, or mist. hydrarg. et pot. iodid, N.F., gave better results; but as the precipitate was still somewhat amorphous, difficulty was experienced in filtration, and more particularly in washing the precipitate on the Gooch crucible. On collecting the portion carried through with the filtrate and washings and adding this to the weight of the main portion, results corresponding to 22.0 per cent., 23.7 per cent., and 22.2 per cent. of solution of mercuric chloride respectively were obtained, but a fourth quantity, which had been allowed to remain on the water bath for about an hour after its evaporation to dryness yielded sulphide equivalent to only 11.0 per cent. of the mercuric chloride solution. Since the addition of potassium iodide to the mixture, therefore, retards the loss during evaporation and has some bearing on the ease with which precipitation is effected, the proportion was increased beyond that of mist. hydrarg. et pot. iodid. to twice that quantity and still further. The additional potassium iodide was added to the mixtures before evaporation, but in the case of the experiments with 4.57 per cent. of potassium iodide, almost complete precipitation was effected after heating once and saturating twice with hydrogen sulphide, but the washings still tended to carry amorphous sulphide through the Gooch crucible. Two trial mixtures with 7 per cent. of potassium iodide added were found to yield results corresponding to 24.6 per cent. and 24.8 per cent., of solution of mercuric chloride and clear filtrates and washings were obtained. In similar experiments when the liquid was cautiously evaporated on a gently boiling water bath and removed as soon as dry, care being taken not to allow the steam from the bath to blow across the surface of the dish, practically the whole of mercury present was recovered. Equally good results were obtained by the same process on a mixture in which the infusion of calumba was replaced by infusion of gentian, and in this case also the omission of the potassium iodide prevented satisfactory precipitation with or without previous evaporation. No attempt has been made to explain the action of the potassium iodide under these conditions, but it may be of interest to note that sodium chloride does not prevent the loss of mercuric chloride by evaporation or in any way assist the precipitation of the sulphide.

The table below gives the results obtained in terms of percentage of solution of mercuric chloride (1 in 1000) on mixtures containing 25 per cent. of liq. hydrarg. perchlor. and 12.5 per cent. of inf. calumb. (ex conc. 1—7), with and without the addition of potassium iodide:—

Experiment	Percentage of KI present	Percentage of liq. hyd. perchlor. found
1	nil	10.5
2	nil	10.7
3	nil	10.0
4	2.286	22.0
5	2.286	23.7
6	2.286	22.2
7	4.571	22.8
8	7.0	24.6
9	7.0	24.8
10	7.0	24.9

PROCESS RECOMMENDED

To not less than 150 mils of a mixture containing about 25 per cent. of solution of mercuric chloride and the concentrated infusion add potassium iodide to a concentration of not less than 7 per cent.; evaporate

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the mixture just to dryness on a water bath, care being taken not to allow the steam from the bath to blow across the surface of the dish, and digest the residue overnight with 20 mils of water and 3 mils of hydrochloric acid; filter and wash with 70 mils of water, make alkaline with ammonia and then just acid with 1 per cent. hydrochloric acid, and saturate with hydrogen sulphide; warm on a water bath for twenty minutes, again saturate with hydrogen sulphide and allow to stand for not more than 1 hour; filter on a Gooch crucible, wash with 50 mils of cold water, with three quantities of carbon tetrachloride, and finally three times with 10 mils of alcohol; dry to constant weight at 100° C; each gram of residue is equivalent to 1.167 gram of mercuric chloride.

Several mixtures dispensed under average dispensing conditions have been examined by this method, and the proportion of mercuric chloride present has been found to be approximately correct.

Conclusions

The presence of 7 per cent. of potassium iodide prevents, when ordinary care is taken, any appreciable loss of mercury during the evaporation of solutions or mixtures containing mercuric chloride. It also enables the mixture containing the precipitated mercuric sulphide to be heated on the water bath without loss by volatilisation and the sulphide to be collected in a sufficiently granular form to minimise the difficulty previously experienced in filtration and washing. By the method described the mercury content of mixtures containing vegetable infusions can be determined with a high degree of accuracy.

This communication was read by Mr. Corfield in the absence of the authors.

Discussion

Mr. Brindle said the facts in the paper would be of great service to analysts, otherwise they may be led into serious error. He wondered if the authors had tried the electrolytic method for the estimation of mercury. He had found this most satisfactory.

The Chairman tendered the thanks of the members to the authors.

The final paper to be read at this session was that on

The Preparation and Composition of the Precipitated Phosphates of Calcium

By Norman Glass, A.I.C., and A. J. Jones, A.I.C., Ph.C.

[Abstract]

This paper deals in a general way with the reactions between a calcium salt and phosphoric acid when they are brought together in solution under varying conditions; and a method is given whereby the proportions of the resulting dibasic and tribasic phosphates or the excess lime in a basic phosphate may be determined in a speedy manner sufficiently accurate for most practical purposes. [A review of the existing literature opens the monograph.] One of the present authors, while estimating the phosphate in chemical food, had made use of a differential titration method for the assay of calcium phosphate, in which the substance was dissolved in a known excess of standard acid and the solution back titrated with standard sodium hydroxide, first using dimethylaminoazobenzene and then continuing with phenolphthalein at a temperature of 70° C., as in Shireman's method for estimating the third hydrogenation in phosphoric acid. This process was now tried again, and gave good results in connection with some trade samples of calcium phosphate. But the method failed on one of the specimens prepared in the laboratory, the trouble being located in the usual place for this type of titration, namely, the phenolphthalein end-point. In previous papers each succeeding author has tried to overcome this difficulty by altering the indicator, changing the temperature, or varying the concentration, and it appears to have been possible to adjust the conditions sufficiently well to enable the phosphoric acid estimation to be carried out with apparent accuracy; but the end-point only indicates an artificial condition of balance, and any departure from the standard conditions will lead to failure. At all events, the method admits of no very extensive application to the present problem. In view of this development, attention was directed to the mechanism of the reaction between sodium hydroxide and solutions containing phosphate, chloride, and calcium under various conditions. Some information was obtained during the preparation of the various specimens, and some was the outcome of analytical trials. A check was made on Smith's modification of Shireman's method and good results were obtained, but, as expected, the process could not be extended to include a titration in which calcium was present from the commencement. The fact of the presence of calcium from the outset constitutes the vital difference between the titration of the third hydrogen in phosphoric acid by methods such as Shireman's and the titration of an acid solution of calcium phosphate. A solution of calcium phosphate in hydrochloric acid may be regarded as a solution of calcium chloride and phosphoric acid, in which gradual neutralisation is to be effected by sodium hydroxide, and in which the calcium chloride reacts with sodium phosphate as that body is formed. In the second stage of the reaction, namely, from the commencement of the formation of Na_2HPO_4, calcium phosphate begins to precipitate, and it is from this point that a complicated series of reactions is set up, whether in analysis or in manufacture. In order to show the effect of changing conditions upon the titration of such an acid phosphate, a series of experiments was performed with phosphoric acid in the presence of calcium chloride, under widely different conditions of concentration and temperature and with various indicators. [Details, with a table, are given.] To show what variations might result with different indicators, titrations were conducted, taking the exact equivalent of calcium chloride and completing the titration at boiling temperature. [The results are given in a table.] When the progress of the reaction was better understood it became evident that nothing satisfactory could be done with the "third hydrogen" method, and search was made for some other means of arriving at the desired result.

Finally, a rather rough but flexible method was adopted, quite suitable for comparing samples of widely different composition, which made use of the loss on ignition and the amount of acid absorbed by the phosphate in being converted to calcium acid phosphate. The procedure is as follows:—

One gm. of the sample is ignited to constant weight, either in the muffle furnace or over the blowpipe. Another gram of the sample is dissolved in 25 c.c. $N/1$ HCl and back titrated with $N/2$ NaOH using dimethylaminoazobenzene as indicator. This gives the acid "absorbed," and the calculation is then as follows:—From the loss on ignition calculate the acid required for one gm. of the ignited material. This latter is assumed to consist of tribasic calcium phosphate together with pyrophosphate from the ignition of $Ca_2H_2(PO_4)_2$; or calcium oxide and tribasic calcium phosphate from samples containing an excess of lime. These titration figures may now be apportioned between the two compounds by alligation and converted to percentages on the original sample. [Examples are given.] There are several weaknesses in the method as it stands.

Preparation of Specimens

In all, some thirty samples were examined, and of these about one dozen had been specially prepared with a view to obtaining as great a variety as possible. A stock solution of calcium phosphate in hydrochloric acid was first prepared, by dissolving some ordinary "calc.

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phosph. præcip." in a minimum of hydrochloric acid, estimating the calcium and the phosphoric acid, and adjusting to the correct ratio for $Ca_3P_2O_8$ by the addition of calcium chloride. From this liquor the calcium phosphate was precipitated in various ways. The most satisfactory way of washing the precipitate was found to be by percolation, the mother liquor and wash water being allowed to drain away from a large Buchner funnel. To a portion of the phosphate solution, dilute caustic soda was added until the free hydrochloric acid had been neutralised, as indicated by dimethylaminoazobenzene. There was, of course, no precipitation at this stage. The theoretical amount of NaOH solution for complete neutralisation was then prepared according to the analysis, and this was added very slowly and with brisk agitation. Exceptional care was taken to break up the little gelatinous clots that formed, and to keep the particles as dispersed as possible. Very soon the clots disappeared and the precipitate changed to fine sandy granules which settled rapidly to the bottom of the vessel. The gelatinous nature of the precipitate entirely disappeared and minute crystals followed the rod around the sides of the beaker, leaving streaks similar to those which are so characteristic of the formation of cream of tartar when the sides of the vessel have to be scratched in order to make the precipitate appear. It soon became apparent that the further addition of alkali was not producing normal precipitation, and the supernatant liquor, when tested, was found to contain no phosphate, but a considerable amount of calcium, and the liquor was alkaline to phenolphthalein. At this stage the operation was discontinued and the deposit was analysed: this is precipitate (1). By the addition of sodium phosphate another liquor was prepared from the stock solution such that sufficient extra PO_4 was present to combine with the calcium left in solution in the previous experiment. Once more the addition of caustic soda to the phenolphthalein end-point failed to precipitate all the calcium: this gave precipitate (2). A third experiment was performed on the same lines, but the caustic soda was added in excess far beyond the amount necessary to react with the phenolphthalein. It was found that this liquor contained no calcium: this gave precipitate (3). The analyses of the three precipitates thus obtained were as follows, the figures being brought to 100 per cent. basis:—

	Dibasic	Tribasic
Precipitate (1)	79.7 per cent.	20.3 per cent.
Precipitate (2)	39.9 per cent.	60.1 per cent.
Precipitate (3)	12.9 per cent.	87.1 per cent.

In another experiment the caustic soda precipitation was carried out to finality without the addition of sodium phosphate; that is, the alkali was run in with vigorous stirring until no calcium remained in the liquor. The variation in physical character of the precipitate was most marked, and while the cake was still wet a slimy layer was removed from the top, and this was treated separately. It amounted to about 6 per cent. of the total, and dried to a hard, horn-like mass. When the main bulk was dry, it was found possible to separate different fractions to some extent by differential grinding and sieving. The pieces of the dry Buchner cake were rubbed between the fingers and gently rubbed on to a 60 silk sieve, and 84 per cent. came through. Only with considerable effort could the remaining fragments be powdered by the fingers, and so they were lightly crushed by a glass roller, after which it was possible to pass a further 12 per cent. through the sieve. The remaining horny fragments (4 per cent.) were ground in the mortar and all made to pass through the sieve. The analyses of the various portions brought to 100 per cent. basis were as follows:—

	$Ca_3(PO_4)_2$	CaO
Separated slime	94.3 per cent.	5.7 per cent.
The bulk, hand sieved ..	98.7 per cent.	1.3 per cent.
The bulk, under roller ..	98.0 per cent.	2.0 per cent.
The bulk, mortar ground ..	96.1 per cent.	3.9 per cent.

The reverse method of combination was tried next, and the acid liquor run into the correct amount of caustic soda. Unlike the previous sample, the precipitate was quite homogeneous, being in the form of a thin jelly which hardly settled at all. It was drained on the Buchner and washed by percolation as usual, and was found to contain, on the 100 per cent. basis, 97.1 per cent. tribasic and 2.9 per cent. calcium oxide. Other methods of precipitation were tried, using ammonia as the precipitating agent, and the effect of the feebler alkali was most marked. As before, precipitates were formed by adding the phosphates to the alkali as well as in the reverse direction, and in one case the solution was raised to a temperature of 90° C. before the addition of the ammonia. This latter procedure gave a mixed product which settled in a beaker in two layers, granular and semi-gelatinous, but, on standing, the gelatinous nature of the other layer slowly changed, and finally the whole precipitate had a uniform sandy appearance. When carried out in the cold, additions of ammonia to the acid solutions produced the granular form, while the reverse process gave gelatinous precipitate. All this bore marked similarity to the previous work with caustic soda, but, as the following results show, the ammonia failed to "fix" the calcium in the same way as the caustic soda did. The analyses were as follows:—

	$Ca_3(PO_4)_2$	$Ca_2H_2(PO_4)_2$
Ammonia to acid liquor cold ..	49.8 per cent.	50.2 per cent.
Ammonia to acid liquor hot ..	52.0 per cent.	48.0 per cent.
Acid liquor to ammonia ..	87.8 per cent.	12.2 per cent.

Two other methods of precipitating suggested themselves, namely, the use of neutral calcium chloride solution with di- or trisodium phosphate. In the case of the di-solution phosphate, the precipitation was tried in both directions with the following results:—

	$Ca_3(PO_4)_2$	$Ca_2H_2(PO_4)_2$
Calcium added to phosphate	8.2 per cent.	91.8 per cent.
Phosphate added to calcium	36.8 per cent.	63.2 per cent.

In the first experiment the calcium chloride was added in slight excess; in the second experiment, equivalent quantities were used. The experiment with tribasic sodium phosphate was performed by adding the phosphate solution to the calcium chloride. When the theoretical quantity had been added there was still calcium in the liquor, and after standing overnight a little more phosphate was put in. This completed the removal of the calcium from the solution. The precipitate was very gelatinous indeed, and hardly settled at all. It was washed in the usual way, but seemed to require much more water than the other precipitates. Its analysis showed 91.9 per cent. tribasic and 0.9 per cent. calcium oxide.

Finally, a sample of B.P. 1914 calcium phosphate was prepared by following the meagre official directions, namely, by "the interaction of calcium chloride and sodium phosphate with excess of ammonia at boiling temperature." The calcium chloride solution was brought to the boil and the sodium phosphate and ammonia added, the heating being maintained. Lumps of jelly formed first, and then a heavy lumpy sludge, which settled fairly well. There was excess phosphate in the liquor, but the precipitate was washed and dried without any further treatment. The assay, on the 100-per-cent. basis, was 99.26 per cent. tribasic and 0.74 per cent. calcium oxide.

With reference to the dilutions at which these experiments were performed, after a number of trials it was found that for the best results the concentration of the acid liquor should not be much above $2N$ when titrated to the phenolphthalein endpoint with alkali, while the sodium hydroxide solutions should certainly never exceed 20-per-cent. strength. These figures, of course, represent maximum values, and many of the experiments were carried out at much greater dilutions. Should these reactions be allowed to take place at too high concentration, or should the mixing be inefficient, it will be found that chloride is combined with the pre-

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cipitate and cannot be washed out. This is a rather remarkable state of affairs, and it would appear that a definite chloro-phosphate is formed; and such compounds have indeed been mentioned by previous workers.

Conclusions Based on the Results Obtained

Following the results of the experiments just described, the conclusions have been drawn that almost any proportion of di- and tribasic phosphate may occur in a sample according to the degree of alkalinity maintained in the liquor during the progress of the reaction; and also upon the time of digestion after the actual precipitation of the phosphate has been completed. The latter condition allows for hydrolytic changes in the dibasic salt and for a certain degree of equilibrium to be attained for a given mixture.

Summarising the general case, it may be contended that when the reacting mixture passes through degrees of hydrogen-ion concentration from 3 to 11, by adding caustic soda to an acid phosphate solution, the precipitation proceeds in three stages:—(1) The production of dibasic calcium phosphate; (2) the precipitation of a certain amount of tribasic salt coincident with the formation of more dibasic, and later, the conversion of some of the preformed dibasic into tribasic salt; (3) the absorption of calcium hydrate produced in the final stages of adding the alkali. This scheme assumes a balanced liquor. Should calcium be deficient or in excess of the amount required for the formula $Ca_3(PO_4)_2$, then considerable modification will occur in the course of the reaction towards the end. All samples examined by the present authors have contained sufficient calcium to account for both dibasic and tribasic salts within the same sample. In view of the method of preparation it can hardly be conceded that actual $CaH_4P_2O_8$ would be present in a sample of pharmaceutical calcium phosphate. The "acidity figures" must be regarded, therefore, as indicating the degree of hydrolysis attained by any sample when submitted to the conditions of the "acidity" test, and it is desirable to distinguish between real acidity due to an essentially acid salt, and potential acidity which only develops when conditions favour hydrolysis.

Commercial Samples

Apart from the specimens specially prepared, various supplies of calcium phosphate bought on the market were examined, and typical examples of these are given:—

No.	Marks	Total Ca as tribasic salt	Dibasic salt	Tribasic salt	Loss on ignition
		Per cent.	Per cent.	Per cent.	Per cent.
1	Præcip. B.P. ..	85.1	42.1	53.1	7.6
2	Præcip. B.P. ..	86.1	36.8	58.1	7.5
3	Præcip. B.P. ..	56.3	72.3	1.4	28.9
4	Food and drugs	63.5	79.4	3.2	21.6
5	Præcip. B.P. ..	86.2	35.6	59.1	7.7
6	Præcip. B.P. ..	89.9	22.6	72.7	6.2
7	Præcip. B.P. special	84.8	44.3	51.1	7.5
8	Præcip. B.P. ..	87.4	33.6	61.9	6.7
9	Præcip. ..	73.6	60.9	27.3	15.8
10	Præcip. B.P. ..	86.0	11.2	77.5	12.0
11	Præcip. B.P. ..	88.3	5.4	84.4	10.4

The figures as a whole have been rounded off to the nearest 0.1 per cent. in order that a false impression of the accuracy of analysis shall not be given. Sample 3 contained 2.1 per cent. of calcium sulphate and sample 4 contained 1.04 per cent.

The work involved in this paper was carried out in the laboratories of Evans Sons, Lescher & Webb, Ltd., Liverpool.

Discussion

Mr. Evers confirmed the authors' experience of the complex nature of this material.

Dr. Hampshire said what was wanted was a good general diluent. They wanted a uniform calcium phosphate.

Mr. Ferrey asked if Mr. Jones had any method of estimating moisture, other than combined moisture, in the salt.

Mr. Jones replied.

Science Section

Wednesday Morning

Shortly after 10 a.m. Mr. Skinner, chairman of the Conference, took the chair, and called on Mr. A. D. Powell to read the communication on:

The Estimation of Lead and Other Metals in Iron Salts

By A. D. Powell, A.I.C., and G. F. Hall, B.Sc., A.I.C.

[Abstract]

The estimation of traces of lead in the presence of iron, state the authors, is attended by considerable difficulties. In a recently published paper on the determination of lead in dyestuffs, N. L. Allport and G. H. Skrimshire drew attention to these difficulties, and recommended an extraction method. The authors have found that this method provides a satisfactory means of separating traces of lead from iron. For some time they have been using a method by which the separation of the iron and lead is effected by extraction, but in the reverse way from that of Allport and Skrimshire. The use of ether as a solvent for ferric chloride was recommended as a basis for the analysis of steel by Rothe, and the solubility of other metallic chlorides in this solvent was investigated by Mylius and Hüttner. The authors' preliminary experiments showed that iron is not removed quite so rapidly as stated by Mylius and Hüttner from solutions of 20-per-cent. hydrochloric acid concentration, and better results were obtained if the acid concentration was increased to 25 per cent. The presence of nitric acid does not interfere with the extraction. It is also unnecessary to remove citric or tartaric acids, if present, and direct extraction may be carried out on solutions of such substances as iron and ammonium citrate. The insolubility of lead chloride in ether under these conditions of extraction was proved by the addition of known amounts of lead, varying between 0.05 mgm. and 1 mgm., to solutions of ferric salts. Experiments show that the loss of lead is negligible. (The authors give a table.)

The details of the test as generally carried out are as follows:—An amount of iron salt containing from 0.5 to 1.0 gram of Fe is dissolved in 20 c.c. of hydrochloric acid (25 to 27 per cent. w/w) and strong nitric acid is added in sufficient amount to oxidise any ferrous iron (0.5 to 2.5 c.c.). The solution is boiled and cooled, care being taken not to reduce the strength of acid by unnecessarily prolonged boiling. If prolonged oxidation is necessary, the hydrochloric acid concentration should be adjusted before extraction. The cold solution is placed in a separator and the iron extracted by three 20 c.c. quantities of ether. If the acid solution is still coloured, a fourth extraction should be made. The acid solution is then heated on a steam bath in a narrow-necked flask until dissolved ether has volatilised. The solution is then almost neutralised with ammonia, potassium cyanide added, and the lead test completed by the usual process of the Pharmacopœia. If desired, tests for other likely impurities may be made on this solution. A series of determinations made on iron and ammonium citrate obtained from various sources at different times shows that considerable variation in the lead content occurs. (A table is given.)

Summary

Traces of lead may be separated quantitatively from considerable quantities of iron by extraction of the iron as ferric chloride with ether from hydrochloric

acid solution. The concentration of hydrochloric acid is of some importance, and should be approximately 25 to 27 per cent: w/w.

The method is suitable for use with iron salts, which normally contain appreciable traces of lead, and may contain much more than is desirable. Most other metallic impurities are either insoluble or only very slightly soluble in ether, and their presence in iron salts may be shown after removal of the iron.

This work was carried out in the analytical laboratories of Boots Pure Drug Co., Ltd.

Discussion

Mr. A. J. Jones characterised the paper as an extraordinarily interesting one, revealing a state of affairs of which they were not aware, and he inquired where the lead came from. If a limit is set, that may be satisfactory for the analyst, but is one to set a standard to force manufacturers to it? It is not wise to find the possibilities and then set a standard. General technical work has its limit. The lead is not in the citric acid; it is not likely to be in the ammonia, nor is it likely to come from the apparatus used, therefore it must come from the iron. Manganese probably comes from the sulphuric acid. Mr. Powell, in the course of his reply, said if reasonably good iron sulphate is used and 25 parts per million of lead is allowed, there will be about 75 parts per million in the citrate, actually there was rather more. As regards the vessels used for manufacture, he had seen wood containers made with red lead jointing.

The next paper was:—

The Copper Content of Certain Pharmaceutical Preparations and Chemicals

By Norman Evers, B.Sc., F.I.C., and
L. A. Haddock, B.Sc., F.I.C.

[Abstract]

An outline of the authors' recently published method for the determination of minute amounts of copper in the presence of iron and certain other metals is as follows:—

The volume of the solution to be examined is adjusted to approximately 70 c.c. and if iron, manganese or chromium is present, 2 gm. of citric acid are added for each 0.1 gm. of iron or 0.2 gm. of manganese or chromium. In the case of manganese, 5 c.c. of 5 per cent. sulphurous acid solution is also added. Ferrous iron must be absent and chromium must be present as a chromic salt. A 10-per-cent. solution of ammonia is added until the final Ph is approximately 9, the final volume of the solution being not greater than 80 c.c. In the presence of chromium, the citrate solution must be boiled and cooled before the final Ph adjustment. In the presence of zinc, aluminium or stannic tin, a slight excess of sodium hydroxide solution is added, and it is only necessary to add citric acid if more than traces of iron are present. To the solution, alkaline with ammonia or sodium hydroxide, 10 c.c. of a 0.1 per cent. solution of sodium di-ethyldithiocarbamate solution is added and the colour due to the copper compound is extracted with four quantities of 2.5 c.c. of carbon tetrachloride, added from a burette. If the last extraction is more than faintly coloured, the extraction is continued and the final volume of the carbon tetrachloride is adjusted to 20 c.c. The colour of the mixed extracts is measured in a 1 cm. cell in a tintometer, and the amount of copper can be found from tables prepared by the authors. The presence of not more than 0.5 mgm of lead, cobalt, nickel or bismuth does not affect the results. This method has been applied with slight modifications to the quantitative examination for copper in certain pharmaceutical preparations and chemicals.

In the case of organic substances the method of procedure was as follows: A weighed quantity of the substance was ignited in a platinum dish in an electric muffle furnace at as low a temperature as possible. After removal of all the carbon, the ash was dissolved in a small quantity of hydrochloric acid, and the solution was washed into a flask. A few drops of 100 vol. hydrogen peroxide were added, and the solution was boiled for a few minutes in order to oxidise any iron present. After cooling, the volume of the solution was adjusted to a known amount, and an aliquot portion was taken for examination for copper according to the method described. This preliminary procedure was also necessary in the case of organic salts of iron. In the case of substances containing phosphorus or a high proportion of alkali metal sulphates a silica basin was used in preference to one of platinum. Hypophosphites were initially oxidised with bromine, excess of which was removed by boiling. The soluble salts of the alkali metals and organic acids were examined without preliminary ignition. Chemicals containing zinc, aluminium, manganese, chromium, tin or magnesium present as inorganic salts, were examined without preliminary treatment.

The results of the examination of various chemicals are set out below:—

Chemical	Copper parts per million
Ammonium chloride	2.4
Betanaphthol	2.7
Calcium chloride	1.2
Calcium hydroxide	2
Chrome alum	25
Citric acid	8
Ferric and ammonium citrate B.P. No. 1	66
Ferric and ammonium citrate B.P. No. 2	48
Ferric and ammonium citrate B.P. No. 3	52
Ferric glycerophosphate	68
Ferric hypophosphite	60
Ferric and quinine citrate	36
Ferric valerianate	38
Hydrochloric acid	0.4
Lactic acid	6.5
Magnesium	1.1
Manganese hypophosphite	16
Oleic acid	14
Phosphoric acid B.P.	6.7
Potash alum	0.2
Potassium bitartrate	7.7
Potassium citrate	2
Potassium iodide	0.8
Sodium hypophosphite	1.8
Sodium nitrate	2.5
Sodium potassium tartrate	2.2
Sodium salicylate	1
Tannic acid	24
Tartaric acid	5
Zinc chloride	5.5
Zinc iodide	0.7

Certain galeniçals and miscellaneous substances gave the following results:—

Preparation	Copper parts per million
Aloin	12
Catechu	6
Conf. sennæ B.P.	11
Dextrose	4.4
Ext. belladonnæ liq. B.P.	28
*Ext. belladonnæ sicc. B.P. No. 1	77
*Ext. belladonnæ sicc. B.P. No. 2	230
*Ext. belladonnæ sicc. B.P. No. 3	270
*Ext. belladonnas viride B.P., 98. No. 1	194
*Ext. belladonnas viride B.P., 98. No. 2	185
*Ext. belladonnas viride B.P., 98. No. 3	360
Ext. cinchonæ sicc.	159
*Ext. ergotæ B.P. No. 1	580
*Ext. ergotæ B.P. No. 2	355
*Ext. ergotæ B.P. No. 3	90
Ext. filicis liq. B.P.	54
*Ext. hyoscyami B.P. No. 1	370
*Ext. hyoscyami B.P. No. 2	275
*Ext. hyoscyami B.P. No. 3	440
Ext. nucis vom. liq. B.P.	51
Ext. nucis vom. sicc. B.P.	74
Ferri carb. sacch. B.P.	73
Ferri phosph. sacch. B.P.	70
Gelatine	10
Indigo carmine	145
Lard	4
Liver extract, dried	170
Malt extract, dried	25
Mel boracis B.P.	8
Pil. ferri carb	44
Syr. ferri phosph. co B.P.C.	8,7
Syr. ferri phosph. c quinin. et strychnin B.P.	21
Syr. glycerophosph. co. B.P.C.	6.5
Thyroid gland, dried	34
Tinct. benzoin. co. B.P.	17
Tinct. camph. co. conc. 1–7	6.5
Tinct. digitalis B.P.	9
Tinct. hyoscyami B.P.	19.5
Tinct. persionis B.P.C.	6.5
Tinct. stramonii B.P.	6·5
Tinct. valerian ammon. B.P.	4

*These samples were obtained from three different pharmaceutical houses.

It will be seen that, as is to be expected, the preparations which have been evaporated in copper vessels such as the soft and dry extracts are the ones most seriously contaminated with copper. In view of the

recent observations on the value of traces of copper in hæmoglobin formation it is unlikely that these amounts of copper would be harmful.

Discussion

Mr. Rutherford Hill said the paper reminded him of his own contribution to the Conference of 1884, entitled "Copper in Some Pharmaceutical Preparations." The present paper was a much more finished work, but the results were similar. He thought that copper-jacketed pans should not be used for evaporation. He preferred pans which were tin-lined or of block tin. Whenever copper-jacketed pans were used the product usually became contaminated. Mr. Hill instanced a case in which a mixture containing nux vomica and aromatic spirit of ammonia changed colour. There was, he said, copper normally present in some natural products. Fine methods of analysis detected traces of copper where it was never suspected before. He thought that the evidence presented in the paper definitely condemned the use of copper-jacketed pans.

Dr. Bryant said it was strange that the copper content of liquid extract of nux vomica was lower than that of the dry extract.

Mr. Rae said Mr. Evers did not mention extract of cannabis indica, which, when made by means of a nickel vacuum still, was brown in colour. The usual green colour of the extract was due to the copper from the pan.

Mr. Evers agreed that naturally occurring copper was universal. It was certainly an omission not to have mentioned extract of cannabis indica.

The next paper, read by Mr. R. R. Bennett in the absence of the authors, was:—

New Methods for the Determination of Traces of Lead and Copper in the Presence of Iron, with Special Reference to Iron and Ammonium Citrate

By Noel L. Allport, A.I.C., and G. H. Skrimshire

[Abstract]

In view of the large dosage already used in iron therapy the determination of lead present as impurity has become a problem of considerable importance. The authors have found that their method for determining traces of lead in dyestuffs and organic material generally ("Analyst," 57, 440) is not vitiated by the presence of iron, and is even applicable to iron salts. After preliminary wet-oxidation of the material, the residue is treated with water, citric acid, excess of ammonia and a little potassium cyanide, followed by extraction of the aqueous liquid with a solution of diphenylthiocarbazone in chloroform. After removal of chloroform by evaporation, the organic matter is destroyed by wet oxidation and the lead determined colorimetrically as sulphide. The accurate estimation of traces of copper in medicinal iron preparations and foodstuffs has also become a matter of importance since it has been found that in order to promote hæmoglobin formation it is essential that traces of copper are present in the iron compounds administered for this purpose. Copper may be extracted from alkaline solutions, in the absence of potassium cyanide by shaking with a solution of diphenylthiocarbazone in chloroform. It was proposed, therefore, to extract copper and lead in this manner, but experiments gave unsatisfactory results owing to the extraction of lead being inhibited unless the alkalinity of the aqueous liquid was adjusted suitably. The degree of alkalinity is not very critical, but loss of lead results if the solution becomes faintly acid or is too strongly alkaline. The extraction of copper did not present any difficulties, but the choice of a suitable reagent for its colorimetric determination was the subject of many experiments. Attention was directed finally to dithiooxamide $(CS.NH_2)_2$, also known as rubeanic acid. This reagent in the presence of acetic acid (2 per cent.) and ammonium acetate (1 per cent.) produces an olive-green colour with copper, but no coloration whatever with lead, manganese, bismuth, tin or zinc. The free acetic acid reduces its response to cobalt and nickel, and though sensitivity to copper is also lowered, differences of 0.01 mgm. may be detected easily. For the determination of lead and copper in medicinal iron preparations, the following procedure was finally adopted:—

To 2 gm. of the sample contained in a 350-c.c. conical flask of resistance glass is added 5 c.c. of water and 10 c.c. of concentrated sulphuric acid. The mixture is gently heated and 10 c.c. of 30 per cent. hydrogen peroxide slowly added and the mixture boiled. More hydrogen peroxide is added as necessary until the organic matter is completely oxidised (as indicated by the absence of charring when all the excess water has been boiled off). To the cooled residue 50 c.c. of water and 10 c.c. of concentrated hydrochloric acid are added, and the contents of the flask gently boiled until a perfectly clear solution is obtained. This liquid is cooled, and a previously prepared solution made by dissolving 10 gm. of citric acid in 50 c.c. of water and 30 c.c. of ammonia (s.g. 0.880) is added. After this addition, the mixture is again cooled and neutralised with dilute ammonia (10-per-cent.), the observation of the reaction being made with litmus paper dipped into the well-cooled mixture. A further 10 c.c. of dilute ammonia is added and the liquid is transferred to a separator and immediately extracted three times by shaking vigorously with a recently prepared 0.1-per-cent. w/v solution of diphenylthiocarbazone in chloroform, 10 to 15 c.c. of the reagent being used for each extraction. Each extract is washed in turn with about 20 c.c. of water contained in another separator, and then transferred to a small flask of resistance glass and the chloroform evaporated. About 0.5 c.c. of sulphuric acid is added to the residue and the organic matter destroyed by heating with a few drops of nitric acid. The excess of nitric acid is removed by adding a few drops of water to the cooled solution and heating until white fumes appear. This residue, which will contain all the lead and copper originally present in the material taken for the determination, is diluted with water and 1 gm. of citric acid and 4 gm. of ammonium acetate added; when solution is complete the liquid is rendered slightly alkaline with ammonia and its volume made up to 100 c.c. The copper is determined by transferring 25 c.c. to a Nessler glass, neutralising to litmus with glacial acetic acid, adding 2 c.c. of the same acid in excess, diluting to 100 c.c. with water and finally adding 1 c.c. of a 0.1-per-cent. w/v solution of dithiooxamide in 95-per-cent. alcohol. The olive-green colour due to copper develops to its full intensity in about one minute and is matched by adding the same reagent to 100 c.c. of an auxiliary solution containing 1 gm. of ammonium acetate and 2 c.c. of glacial acetic acid and a suitable quantity of standard solution of copper sulphate (containing 0.00001 gm. of Cu per c.c.). If the colour to be matched is greater than that given by 6 c.c. of standard copper solution, the test should be repeated, using an appropriately smaller amount of the original solution. The lead is then determined by transferring 25 c.c. of the original solution to a Nessler glass, adding 1 c.c. of 10-per-cent. potassium cyanide, a little dilute ammonia, diluting to 50 c.c. with water, adding 0.1 c.c. of 10-per-cent. sodium sulphide solution and matching the colour in the ordinary way by means of the Dilute Solution of Lead PbT. of the British Pharmacopœia (containing 0.00001 gm. of Pb per c.c.) using an auxiliary solution containing 1 gm. of ammonium acetate, 1 c.c. of 10 per cent. potassium cyanide and the same amount of copper as is known to be contained in the primary solution. If the colour to be matched is greater than that given by 10 c.c. of standard lead solution, the test should be repeated, using an appropriately smaller amount of the original solution.

The final residue in sulphuric acid should be from iron, but the citric acid is added to obviate the possibility of loss of lead by adsorption on lead carried through mechanically. For complete wet combustion about 15 c.c. of hydrogen peroxide is required for each 2 gm. of material taken. This should be added in 5-c.c. portions, cooling a little before each addition. Oxidation takes about twenty minutes to complete.

A larger quantity of material should be taken if the amount of lead or copper present is less than 20 parts per million. Emulsion formation is rare, but dispersal is essential to prevent iron being carried through. The addition of chloroform, water or alcohol overcomes any difficulty of this character. The green

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colour of the chloroformic solution of diphenylthiocarbazone changes to red when much lead is present. Zinc also produces a red colour with this reagent, but does not interfere with the removal of lead or copper. Appreciable amounts of copper cause a brown instead of an olive-green colour. The presence of bismuth is inadmissable, as this metal is extracted by diphenylthiocarbazone, and would interfere with the lead determination. However, bismuth is an unlikely impurity in medicinal iron preparations or in foodstuffs. Examination of a large number of iron preparations failed to reveal the slightest trace of bismuth on applying the thiourea reaction of Sensi and Seghezzo to solutions prepared for the colorimetric determination of lead. Bismuth does not interfere with the estimation of copper by means of dithio-oxamide. The process yields satisfactory results with varying amounts of lead and copper. The results of examination of commercial samples of scale preparations of iron are shown in Table I:—

TABLE I

LEAD AND COPPER CONTENT IN PARTS PER MILLION

Sample No.	Iron and ammonium citrate		Sample No.	Iron and quinine citrate	
	Lead	Copper		Lead	Copper
1 ..	20	25	1 ..	110	45
2 ..	35	30	2 ..	40	120
3 ..	100	15	3 ..	60	30
4 ..	90	25	4 ..	260	45
5 ..	20	—	5 ..	200	20
6 ..	55	85	6 ..	300	90
7 ..	45	100			
8 ..	75	125			
9 ..	175	15			
10 ..	15	45			

The method was applied to the saccharated iron preparations and the scale variety of iron hypophostalc, or manganese) not interfering, as shown in the presence of other materials (such as phosphate, talc, or manganese) not interefering, as shown in Table II, by recovery of added copper and lead. It is suggested that the published figures expressing a very low content of copper in iron preparations may be erroneous, which possibility is of great importance in connection with clinical experiments on absorption of iron and the effect of copper thereon. The use of hæmatinic capsules has been proposed, which contain ferrous carbonate mass (10 gm.) mixed with arsenious oxide (0.06 gm.) and copper sulphate (0.30 gm.). Experiment showed that the arsenic did not interfere in any way with the recovery of copper from such a mixture. However, it noted that ordinary gravimetric or volumetric methods are preferable when relatively large amounts of copper are to be extracted as above.

TABLE II

THE LEAD AND COPPER CONTENT OF VARIOUS IRON PREPARATIONS

Commercial preparations			Recovery of added quantities			
Substance	Lead present (parts per million)	Copper present (parts per million)	Lead solution added	Lead solution recovered	Copper solution added	Copper solution recovered
Saccharated Iron .. Carbonate ..	80	140	80 20 10	75 18 10	25 12 80	25 12 75
Saccharated Iron .. Phosphate ..	55	90	20 60 10	21 60 11	10 40 50	10 40 50
Iron .. Carbonate .. Pill ..	70	60	14 40 8	14 40 7	30 10 70	30 10 70
Iron .. Hypophosphite .. (scale preparation with sodium citrate)	20	45	12 70 30	12 65 30	100 20 5	100 18 5

SUMMARY

A rapid process, suitable for routine work, has been described for the quantitative separation of traces of lead and copper from organic material containing large quantities of iron, including medicinal iron preparations. The method is equally applicable to ferruginous diets containing other metals and phosphates.

Details are given for the subsequent colorimetric determination of the lead by the sulphide method. Conditions have been defined for the colorimetric determination of copper, using dithiooxamide, such that cobalt, nickel, manganese, lead, bismuth, tin, arsenic and zinc will not interfere.

The investigation was carried out in the laboratories of The British Drug Houses, Ltd.

DISCUSSION

Mr. EVERS pointed out that the advantage of the process was that lead and copper could be estimated, though for copper alone he preferred that of the previous paper.

Mr. DEANE remarked that the figures for iron and quinine were higher than those for iron and ammonia. He also inquired where the lead came from and suggested that the copper might come from the iron.

Mr. BENNETT thought the meeting should express its thanks to Mr. Jones for drawing attention to the importance of these impurities.

The CHAIRMAN agreed with Mr. Bennett, and also asked the latter to convey the thanks of the meeting to the authors of the paper.

The following paper was then read by the author:—

Effervescent Properties of Granular Effervescent Preparations

By DAVID S. RATTRAY

[ABSTRACT]

IN a general way it is well understood by pharmacists that these preparations are somewhat perishable, and that it is necessary to exercise reasonable care in their storage if they are to retain unimpaired their effervescent properties—in particular, that they should be preserved in dry air-tight glass bottles in a cool place. No doubt this practical rule finds its sanctions in the pharmacist's mind from certain impressions, gradually acquired through experience, as to the nature and inherent qualities of this particular type of preparation, notably its hygroscopic nature, and consequent liability to premature chemical reaction, implying deterioration. It was to elicit a numerical foundation for such impressions that the inquiry was undertaken, of which the results are summarised in this paper.

The method adopted for estimating the carbon dioxide available in a granular preparation for the production of effervescence was as follows:—A 50 c.c. plain eudiometer, graduated in tenths of 1 c.c., is filled with mercury to a marked point near the open end, leaving only 1 c.c. of space unoccupied by the mercury. This space is then filled with 1 c.c. of a 20 per cent. solution of citric acid in distilled water (for the purpose of inducing reaction after the introduction of the granule). The tube is then firmly closed, wiped dry if necessary, and inverted in a cistern of mercury, care being taken to avoid admission of air. Using filter-paper, the edge of the submerged end of the tube is carefully wiped free from any traces of solution of citric acid, and the eudiometer clamped in position with the open end well under the surface of the mercury—the citric acid solution now occupying a position at the top of the tube. A quantity of the granule to be examined, approximately 0.3 gm., is next weighed off, and formed into a compressed tablet, using a screw compression machine. This tablet is immediately and rapidly weighed, haste being necessary to avoid danger of loss of carbon dioxide from any reaction consequent upon compression. With-

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out delay and by the use of forceps, this tablet is introduced into the open end of the eudiometer, under the mercury, through which it rises rapidly to the acid solution. Upon contact with the latter, a more or less brisk effervescence ensues, and the mercury level sinks. Gradually the evolution of gas diminishes until soon the mercury column ceases to fall. By the use of 20 per cent. solution of citric acid instead of water, to bring about reaction, two advantages are secured, viz., (1) that the reaction is speeded up, especially in the later stages, and (2) that in the later stages, or immediately after reaction is complete, a micro-crystalline precipitate falls, favouring disengagement of gas, and preventing the retention of any appreciable quantity in solution. There is thus rapid and practically complete evolution of gas, the indication of volume being nearly deadbeat. After a short interval the reading is taken, the height of the mercury column measured, and the observed gas volume corrected to normal pressure and 15.5° C. allowance being made for the vapour-pressure of the solution, which was found by calculation to be not widely different from that of water, and was assumed to be the same. From the corrected volume of gas, calculation is then made, to ascertain in each case the number of cubic centimetres of carbon dioxide at normal pressure and 15.5° C. evolved from 1 gm. of the effervescent granule.

Using this method of estimation, experiments were carried out with a number of effervescent granules (chiefly official), directed towards obtaining information on the following points:—(1) The effect upon ultimate gas-yield of using different temperatures in fusing the mixed ingredients, prior to passing through a granulating sieve. (2) The gas yield at various stages of drying at 55° C., subsequent to granulation. (3) The effect upon ultimate gas-yield caused by different modes of storing (implying different degrees of exposure to the atmosphere), and for different periods of time. (4) The average gas-yield of each official granule, containing, as each does, a proportion of sodium bicarbonate different from that of the others; also comparison of this gas-yield with that calculated as present in the ingredients before granulation.

Considering these problems in the order given:—

(1) The effect of the particular temperature employed in fusing the dry mixed ingredients. When these are heated, a limited amount of chemical reaction occurs between the sodium bicarbonate and the two acids (citric and tartaric) made possible by the water of crystallisation of the citric acid, and more or less limited by its amount. It would therefore appear probable, *a priori*, that while rate of reaction depends on temperature used,, the amount of reaction will be comparatively constant; and this view appears to be supported by experiment. Gas estimations were made by carefully prepared specimens of effervescent sodium citro-tartrate, in the fusing of which temperatures of 85° C. and approximately 100° C., respectively, were used. Comparison of the average results, viz., 105 c.c. per gm. from the former, 104.8 c.c. per gm. from the latter, showed only a negligible advantage from the use of the lower temperature: from which it appears probable that the use of different fusion temperatures—provided they sufficiently exceed 75° C., at which temperature citric acid only begins to part with its water of crystallisation—does not greatly affect the gas-yield of the finished product.

(2) To ascertain the gas-yield at various stages of drying at 55° gas estimations were made of sodium citro-tartrate granules, (*a*) immediately after granulation, (*b*) when judged to be about half-dry, (*c*) when completely dry. The results per gm. were respectively 96.6 c.c., 102-8 c.c., and 104 c.c., showing a gradual increase of available carbon dioxide, doubtless due to diminution of total weight, through loss of water.

(3) To test the effect upon ultimate gas-yield, caused by different degrees of exposure to the atmosphere, some specimens of granules were preserved in dry securely corked bottles; some others—which were not prepared, but purchased—were kept in the two-fold crystalline paper (not waxed) and envelopes in which they were supplied; while some were freely exposed to the atmosphere—in several cases for five or six weeks. In each case estimations were made from time to time to ascertain rate of deterioration. It was a matter of great regret and an unfortunate detraction from the value of the results that time did not permit of any attempt to correlate observed results with so important a factor as the hygrometric state of the atmosphere—although observations of the latter would probably have furnished the explanation of several small but distinct temporary increases of gas-yield observed during prolonged exposure, after the stage of semi-deliquescence had passed, and the pasty mass had dried up. The results in the several cases were interesting, although, for the most part, very much in accordance with anticipations. It was found that the granules stored in closely corked bottles underwent little diminution of activity upon keeping: for example, granules of caffeine citrate, yielding per gm. 92 c.c. of carbon dioxide, gave the same result (92 c.c.) after sixty-two days, 91 c.c. after seventy-four days, and 81 c.c. after ninety-eight days—being a loss of only 7 per cent. It was noticeable, however, that granules forming the surface layer in the bottle suffered a greater loss than those occupying more protected positions in the underlying layers. Samples taken from the surface tended on the whole to give lower readings than those extracted from subjacent layers, the most striking instance being that of a specimen of effervescent sodium sulphate which, after giving 87.7 c.c. and 87.4 c.c. of gas as the yield per gm. of the surface layer, gave 93.2 c.c. as the yield per gm. of granules removed from the centre of the mass. Further, it was found that when a given specimen was separated into large granules and small, the large granules tended to give a lower gas-yield than the smaller This seems hardly in accordance with what might be anticipated: one would naturally expect that the smaller granules, offering a greater relative surface area for the absorption of any moisture present, would prove poorer in gas-yield. Perhaps the explanation may be that the fine granules represent part of the ingredients which by inadvertence has escaped being subjected to the temperature necessary for complete fusion, and which hence retains a relatively higher proportion of undecomposed bicarbonate. On the other hand, it might be due to slower drying of the larger granules with correspondingly longer time for decomposition.

Compared with these bottle-stored granules the bought granules, kept in double crystalline paper and envelope (somewhat permeable to moisture, and themselves probably containing about 12 per cent. of moisture), underwent a fairly rapid deterioration—but noticeably at different rates: for example, that of caffeine citrate in seventy-one days diminished from 56.7 c.c. to 56.0 c.c. (a loss of only $1\frac{1}{4}$ per cent.); and after ninety-eight days it still yielded 54.5 c.c. (a loss of barely 4 per cent.). The granule of lithium citrate in ninety-seven days declined from 101 c.c. to 84 c.c. (a loss of 17 per cent.). That of magnesium sulphate in seventy-one days sank from 55 c.c. to 37 c.c. (a loss of 33 per cent.); but on estimating again after ninety-six days had suffered no further diminution. The granule of sodium sulphate in seventy days fell from 88 c.c. to 57 c.c. (a loss of 35 per cent.); but upon estimation after ninety-eight days, it (like the magnesium sulphate granule) showed no further reduction. Much worse than these was the case of the sodium phosphate granule, which in seventy days dropped heavily from 96 c.c. to 16 c.c. (a loss of 83 per cent.), and upon examination after ninety-six days yielded only 7 c.c. of carbon dioxide per gm.! (a loss of 93 per cent.). Perhaps someone may be able to suggest an explanation why these granules, possessing the initial advantage over those of magnesium sulphate and sodium sulphate of containing a higher proportion

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of sodium bicarbonate, should show a loss, relatively so heavy, when subjected to exactly the same conditions of storage. Whatever be the reason for the difference, it would appear as though the order of stability of the official granules, when more or less exposed to the air, might be stated as (1) caffeine citrate, (2) lithium citrate, (3) magnesium sulphate, (4) sodium sulphate, (5) sodium phosphate.

Turning to the case of granules freely exposed to the atmosphere it was found that after a comparatively short exposure, say, overnight, these became temporarily quite soft, semi-deliquescent and pasty; and incapable of being formed into tablets by compression. In this case tablet-formation was accomplished by the use of a tablet-triturate mould. The physical change was accompanied by a heavy loss of carbon dioxide, amounting to about 50 per cent. on the average. Since the loss in these cases (actually in others also, but more strikingly here) was only partly real loss, due to chemical reaction, causing escape of carbon dioxide, and partly seeming loss, due to increase of total weight, caused by absorption of moisture, attempts were made to disentangle the effects of chemical reaction from those due to physical change; but this was found to require more time than was available, and had to be abandoned. Even the uncorrected figures are, however, quite interesting: for example, a specimen of magnesium sulphate granules, showing per gm. 69.7 c.c. of gas, gave, after a single night's exposure, a yield of only 30.0 c.c. (a loss of 57 per cent.). A specimen of sodium citro-tartrate granules, similarly exposed overnight, fell from 106.1 c.c. to 53.1 c.c. (a loss of 50 per cent.).

In all such cases of free exposure it was observed that the semi-deliquescent condition was only of temporary duration, and that later the residue became apparently dry and hard, and again fit to be compressed into tablet form. It might be supposed that by this time all available carbon dioxide would have disappeared, but such was not the case. At no time did any granule (even sodium phosphate, the villain of the piece!) fail to yield gas, and sometimes the yield was surprisingly high. The record of several specimens of granules freely exposed may be instructive:—(1) A granule (*a*) of sodium citro-tartrate. Before free exposure, this gave 93.9 c.c.; after two days, 50.9 c.c.; after seven days, 41.0 c.c.; after nine days, 40.9 c.c.; after fifteen days, 38.3 c.c.; after twenty-one days, 36.2 c.c.; after twenty-seven days, 35.1 c.c.; after thirty-four days, 41.1 c.c.; after forty-five days, 32.2 c.c. (The 41.1 c.c. result is anomalous, but probably due to hygrametric state of atmosphere.) (2) Another granule (*b*) of sodium citro-tartrate. Before free exposure this gave 106.1 c.c.; after one day, 53.1 c.c.; after five days, 37.1 c.c.; after six days, 41.0 c.c.; after seven days, 33.7 c.c.; after twelve days, 32.7 c.c.: after fourteen days, 32.4 c.c.; after eighteen days, 31.2 c.c.; after twenty days, 32.7 c.c.; after twenty-one days, 36.2 c.c.; after twenty-nine days, 31.6 c.c. (Here seeming anomalies again appear.) (3) Another granule (*c*) of magnesium sulphate, checked for only six days, gave:—Before free exposure, 69.7 c.c.; after one day, 30.0 c.c.; after four days, 29.1 c.c.; after six days, 29.2 c.c.

The retention of effervescent properties, after semi-deliquescence and drying up, may perhaps be explained by supposing that isolated particles of undecomposed acid and bicarbonate are kept from reacting at first by becoming surrounded with a saturated solution of neutral salts, which, after drying up, form an incrustation in which the acid and bicarbonate particles are imprisoned, separate from each other, until released by solution in water.

Dealing next with the question of average gas-yields from freshly-prepared official granules, and the comparison of these with the volumes of carbon dioxide existing latent in the ingredients, the results of averaging the most reliable gas-yields per gm. were as follows:—Caffeine citrate 105.4 c.c., lithium citrate 113.8 c.c., magnesium sulphate 69,2 c.c., sodium citro-tartrate 107.6 c.c., sodium phosphate, data insufficient for average, sodium sulphate 92.2 c.c. The difference in the gas-yields is mainly due to the difference in the proportion of sodium bicarbonate present in the different granules. Correlating these volumes with the volumes of carbon dioxide calculated to be present in the corresponding weight of ingredients of the respective granules, the following percentages of gas conserved in the granules were obtained:—Caffeine citrate 84 per cent., lithium citrate 80.5 per cent., magnesium sulphate 80 per cent., sodium citro-tartrate 83 per cent., sodium phosphate data insufficient, sodium sulphate 77 per cent. These percentages complete the programme outlined.

It may be added that difficulties inherent in this inquiry are fairly numerous, as too many independent variables are operative for the results to be other than approximate, and stated with reservation.

Discussion

Mr. Evers asked if the author had investigated the evolution of gas from dry granules due to a rise in temperature.

Mr. Rattray replied.

In the absence of the authors the next two papers were taken as read. They were:—

Halogen Analogues of Adrenalin and Ephedrine

Part I.—α-3.4-dichlorphenyl—β-aminoethanol

By H. E. Glynn, B.Sc., F.I.C., and W. H. Linnell, Ph.D., M.Sc., F.I.C., Ph.C.

[Abstract]

Important differences in the pharmacological activity of adrenalin and ephedrine must be attributed to differences in the constitution of the two compounds. The ease with which dihydric phenols are oxidised may account for the chemical instability of adrenalin. This is responsible for some objectionable properties in connection with its use as a drug. Among these are the short duration of specific action, inactivity when administered orally, and inability to sterilise solutions by heat. For these reasons it was decided to attempt the preparation of α-3:4-dichlorphenyl-β-aminoethanol in the hope that it would be more stable than adrenalin, yet possess similar pharmacological properties. This substance is a disubstituted derivative of β-phenylethanolamine in which the substituent groups are in the same positions as the nuclear hydroxyls in adrenalin and are of the same electronic character. The nuclear halogens in dichlorbenzenes are very much more active chemically than those of monohalogen derivatives, and hence the difference in stability between mono- and dihydric phenols is reflected in a somewhat similar difference between mono- and dihalogen derivatives.

The method adopted for the synthesis of the required compound was based upon the adrenalin synthesis of Scholtz. This entails the reduction of methylaminoacetocatechol formed by the action of methylamine on the product of condensation of catechol with chloracetyl chloride. ω-Chloraceto-3:4-dichlorbenzene was readily prepared by treatment of dichlorbenzene with chloracetyl chloride in the presence of aluminium chloride, but on shaking this product with aqueous or benzene solution of methylamine or with aqueous ammonia no trace of the corresponding ketoamine was obtained. In all cases the side chain halogen was hydrolised with the formation of the ketoalcohol. A similar difficulty was encountered in attempting to prepare methylaminopropionocatechol by the action of aqueous methylamine on brompropionocatechol.

The failure to prepare the amine led to the following scheme being followed: 1-aceto-3.4-dichlorbenzene (1)

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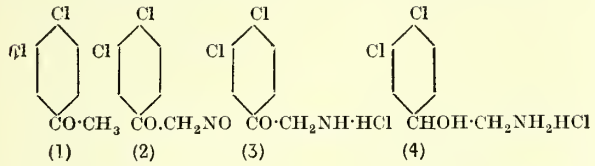
→ isonitroso compound, (2) → hydrochloride of the corresponding aminoketone (3) → aminoalcohol hydrochloride (4).



The 1-aceto-3.4-dichlorbenzene was obtained as a white crystalline solid melting at 76° C., very soluble in carbon tetrachloride, and less so in petroleum ether and alcohol. Conversion into the isonitroso compound (m.p. 143° C.) was effected by adding cold amyl nitrite to a cooled mixture of sodium ethylate and 1-aceto-3.4-dichlorbenzene in ether-alcohol. It was found necessary to reduce the isonitroso compound in two stages, using only neutral or acid media. *ω*-Aminoaceto-3.4-dichlorbenzene hydrochloride was obtained as a white crystalline solid with a very bitter taste. It is soluble in water, but does not melt sharply, being converted into a resinous mass at 255° C. The reduction of this ketoamine to the corresponding aminoalcohol was effected with aluminium amalgam. The product gave figures corresponding with the hydrochloride of *α*-3.4-dichlorpenyl-*β*-aminoethanol (m.p. 245° C.).

The pharmacological examination by Dr. J. H. Burn gave the relative pressor activity of *ω*-aminoaceto-3.4-dichlorbenzene hydrochloride as about 1/500th that of *l*-adrenalin. That of the corresponding aminoalcohol, *α*-3.4-dichlorphenyl-*β*-aminoethanol hydrochloride is between 1/200th and 1/250th that of *l*-adrenalin, but the effect is more prolonged and does not diminish in intensity on repeated administration. In each case the pressor action was abolished by previous injection of cocaine, and thus the new compounds must be classed with ephedrine, tyramine, etc., which are not true sympathomimetic drugs.

In certain experiments it was found that after the injection of *α*-3.4-dichlorphenyl-*β*-aminoethanol hydrochloride the pressor effect of subsequent adrenalin injections appears to be doubled, but this observation could not be confirmed. The toxicity of *α*-3.4-dichlorphenyl-*β*-aminoethanol hydrochloride by intravenous injection into mice is about 1/240th that of *l*-adrenalin. Doses given orally indicated that the compound is active when administered in this way. As the aminoalcohol hydrochloride approximates more closely to ephedrine in its pharmacological properties it was thought advisable to compare it directly with this substance. A convenient method of comparing its potency with that of ephedrine is based upon the fact that the passage of so small a quantity of 0.003 mgm. of ephedrine through the perfused isolated heart of the cat doubles the force of the beat and increases the rate. It was found that twice this quantity of *α*-3.4-dichlorphenyl-*β*-aminoethanol hydrochloride had a very much smaller effect on the force and rate of the beat, although the small effect obtained did not diminish in intensity on repeated administration and appeared to be more regular than that of ephedrine. It is possible that the new compound will not have the depressant action on the heart that is associated with ephedrine. When ephedrine is injected into a cannula through which the hind limbs of a dog are perfused with defibrinated blood to which adrenalin had been added, it produces initially a vaso-dilation followed by constriction. Under the same conditions tyramine does not produce an initial dilation, but only a vaso-constriction. It was found that under these conditions the effect of *α*-3.4-dichlorphenyl-*β*-aminoethanol hydrochloride was like that of ephedrine, 5 mg. being slightly more effective than 2 mg. of ephedrine. This work is being extended to other halogen derivatives of phenylethanolamines and phenylpropanolamines.

There was no discussion.

The Preparation of Certain Aliphatic Amino-Alcohols

By H. E. Glynn, B.Sc., F.I.C., and W. H. Linnell, Ph.D., M.Sc., F.I.C., Ph.C.

[Abstract]

This investigation is concerned with certain benzoic esters of amino-alcohols containing five and six carbon atoms which may be expected to possess some anæsthetic activity. The required compound, 1-amino-2-hydroxy-*n*-hexane, might be expected as a result of reducing the cyanhydrin obtained by condensation of hydrocyanic acid with valeraldehyde. A first difficulty consisted in the initial stage of the synthesis yielding an oily liquid (boiling at 179° C.), which did not contain nitrogen, and was probably a condensation product of valeraldehyde. The cyanhydrin was ultimately obtained by treating the solid bisulphite compound of valeraldehyde with 50-per-cent. aqueous solution of potassium cyanide. It is a colourless, viscid oil, insoluble in water and possessing a pungent odour resembling that of essential oil of almond. The second difficulty was that repeated attempts to reduce the cyanhydrin to the corresponding amino-alcohol were unsuccessful owing to the ease with which the compound loses hydrocyanic acid to the reducing agent (whether sodium and alcohol or sodium amalgam).

Consequently it was necessary to develop another method, and 1-nitro-2-hydroxy-*n*-hexane was prepared by condensing nitromethane with valeraldehyde. This reaction proceeds when small pieces of potassium hydroxide moistened with water are added to the mixture of valeraldehyde and nitromethane, it being necessary to cool to restrain undue heat development. After neutralisation of alkali with hydrochloric acid the product was extracted with ether. On removal of solvent, a dark red viscid oil remained which, on fractionation under reduced pressure, yielded 1-nitro-2-hydroxy-*n*-hexane (boiling at 120° C. under 20 mm. pressure). This is insoluble in, and heavier than, water; it has a characteristic odour and bitter taste. Reduction was achieved by adding the nitro compound to stannous chloride dissolved in hydrochloric acid, stirring vigorously and completing by heating on a water bath for fifteen minutes. After precipitation of tin as sulphide, the product was separated as hydrochloride and directly converted into the benzoic ester by treatment with benzoyl chloride and sodium hydroxide. The ester is a white substance which, after repeated crystallisation from alcohol, melted at 137° C. On analysis it gave figures corresponding with the benzoic ester of 1-amino-2-hydroxy-*n*-hexane.

The new compound possessed little or no activity as a local anæsthetic. As it was thought that anæsthetic action might occur with isomers approximating more closely to the cocaine molecule in structure, it was decided to prepare an amino alcohol in which the separation of the two functional groups was increased by one carbon atom. For this purpose the oxime of acetopropyl alcohol was reduced (by sodium amalgam with acetic acid) to 1-hydroxy-4-amino-*n*-pentane. This on benzoylation yielded a di-benzoyl derivative which was only slightly soluble in water and slightly more so in olive oil. It was expected on the liquid theory of anæsthetic action that the ester would possess little activity, and this was confirmed by a pharmacological trial. The constitution of the amino-alcohols corresponding to the two new compounds is shown contrasted with the amino alcohols corresponding to part of the cocaine molecule and to other analogous anæsthetics.

The inactivity of 1-amino-2-hydroxy-*n*-hexane cannot be ascribed to the relative positions of the amino and esterified alcoholic groups as the same relationship is present in novocaine and in stovaine. On the other hand, the two groupings are further apart in 1-hydroxy-4-amine-*n*-pentane than in any of the cases cited, and this may contribute to the compound's inactivity. The presence of the primary amine groups

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in the two new compounds cannot account for the complete inactivity, but this point is to be the subject of a further communication dealing with the corresponding dialkylamino derivatives.

1-amino-2-hydroxy-*n*-hexane $NH_2{\cdot}CH_2{\cdot}CHOH{\cdot}CH_2{\cdot}CH_2{\cdot}CH_2CH_3$

Cocaine $NCH_3{\cdot}CH{\cdot}CH_2{\cdot}CHOH$

Novocain $NEt_2{\cdot}CH_2{\cdot}CH_2OH$

Stovaine $NMe_2{\cdot}CH_2\,COH{\cdot}CH_2{\cdot}CH_3$ (CH_3)

Butyn $NBu_2{\cdot}CH_2{\cdot}CH_2\,CH_2OH$

Tutocaine $NM_2\,CH_2{\cdot}CH{\cdot}CHOH{\cdot}CH_3$ (CH_3)

1-hydroxy-4-amino-*n*-pentane $NH_2{\cdot}CH{\cdot}CH_2{\cdot}CH_2{\cdot}CH_2OH$ (CH_3)

An examination of the above table of formulæ discloses the fact that, although primary, secondary and tertiary alcoholic groups are represented, in no case is a straight carbon chain of more than four carbon atoms present, stovaine and tutocaine containing five carbons but in branched chain formation. Hence it appears likely that increase in length of the straight carbon chain in amino alcohols causes a decrease in their activity.

The pharmacological trials of these substances were carried out by Dr. J. H. Burn.

There was no discussion, and the CHAIRMAN expressed the thanks of the meeting to the authors for these papers.

The next communication was:—

The Determination of Phenol in Medicaments, and the Phenol Content of Some Nasal Antiseptic Tablets and Phenol Lozenges

By C. E. CORFIELD, B.Sc., F.I.C., PH.C., and L. MARJORIE MUNDY, PH.C.

[ABSTRACT]

THE information of practical value in regard to methods for the accurate quantitative determination of phenol in galenical and compounded preparations of carbolic acid is unsatisfactory. The Koppeschaar method enables phenol in solution in water to be ascertained with considerable accuracy, provided the amount of phenol present is kept within certain limits in relation to the excess of bromide-bromate solution. The only question requiring consideration in dealing with phenol preparations is the quantitative separation of the phenol in the form of an aqueous solution sufficiently free from other matter to permit its volumetric determination by this method. Lotio acidi carbol. and garg. carbol. co. of the National Formulary (for N.H.I. purposes) are examples in which preliminary separation is not necessary, as they contain no ingredient capable of reacting with free bromine or interfering with the normal quantitative assay. This applies also to the various tablets for making nasal solutions. As regards ung. acid. carbol. (B.P. 1914), the phenol can be quickly and conveniently separated from the paraffin ointment base by extraction with a little of a dilute and warm solution of sodium hydroxide, either in a beaker on a water bath, or preferably in a separator. Garg. pot. chlor. cum phenol, N.F., glyc. acid. carbol. and troch. acid. carbol, are examples in which it is necessary or advisable to separate a solution of purified phenol; the following process is recommended as being both accurate and rapid:—

A weighed amount of a solid preparation, or a measured volume of liquid, containing approximately 0.15 gram of phenol, is placed in a 300-mil flask with 25 grams of crystalline calcium chloride and 125 mils of water, and the solution or contents of the flask acidified with hydrochloric acid. The flask is connected with an upright double-surface condenser and the contents distilled until the distillate measures nearly 100 mils. The volume is adjusted if necessary with water to make exactly 100 mils and a volume of from 30 to 40 mils, equivalent to about 0.04 gram of phenol, is titrated by the process of the U.S.P. X, or the process of the B.P. 1932 described under "Phenol."

It is difficult to distil off the last traces of phenol without adding calcium chloride or its equivalent. Nasal antiseptic tablets are sold usually as containing ½ gr. of phenol in each tablet, but samples obtained by wholesale or retail contain a smaller amount. Even in original containers this is not much more than ¼ gr. The loss of phenol is in manufacture and storage. Variation in preparation occurs also, tablets taken from a pharmacist's stock after storage for eighteen months containing more phenol than fresh tablets obtained from the maker.

In tab. nasal. alk. N.F. the phenol has been replaced by thymol, owing to unsatisfactory phenol content as above. In general practice some prescribers prefer to use a nasal wash made directly from the different ingredients instead of using the less satisfactory solution tablets. The following table gives the data regarding nine samples of antiseptic nasal tablets examined by the authors:—

No. of sample	Weight, in grains, of phenol stated to be present in each tablet	Percentage of phenol found	Average weight in grains of the tablets	Average weight in grains of phenol in each tablet
1 ..	0.5	0.28	10.45	0.029
2 ..	0.5	0.35	10.00	0.035
3 ..	0.5	0.90	10.35	0.093
4 ..	0.5	0.045	10.08	0.0045
5 ..	0.5	0.71	10.83	0.077
6 ..	0.5	2.33	10.07	0.235
7 ..	0.5	3.06	9.06	0.277
8 ..	0.5	3.09	9.32	0.288
9 ..	1.0	12.33	9.95	1.227

Two of the first five of the samples were obtained directly from manufacturers, and in both cases the containers were well closed and did not show any crystals of phenol resulting from volatilisation. Samples Nos. 6, 7 and 8 show a deficiency of about 50 per cent.; one of these had been in stock for several months, and no crystals of phenol were observed on the tablets or on the walls of the container, and the other two were new stock, and probably represent the highest phenol content obtainable for tablets of that type. Sample No. 9 contained sugar, and it is possible that its greater stability and its relatively higher phenol content is due to its being prepared by a more modern process. The figures are sufficient to show that the usual nasal antiseptic tablet is unsatisfactory, and liable to contain practically no phenol.

The phenol lozenge of the B.P. 1914 is prepared by mixing phenol, refined sugar, gum acacia, tragacanth and lemon juice, dividing the mass into lozenges and drying in a hot-air chamber at a moderate temperature. It is well known that these lozenges do not always contain approximately ½ gr. of phenol as stated in the Pharmacopœia. The lozenges when carefully stored do not lose phenol rapidly owing to the more tenacious nature of the material, and the deficiency is largely due to loss by volatilisation during drying.

The phenol lozenge of the B.P. 1932 is prepared by mixing liquified phenol, acacia, tragacanth, citric acid, carmine, sucrose and distilled water to form a paste, dividing into lozenges and drying in a hot air chamber at a moderate temperature. Each lozenge is stated to contain approximately 0.03 gram or ½ gr. of phenol. In spite of the fact that such lozenges are known to be deficient in phenol, no assay process has been included, and no official indication is given that any variation is allowable from the strength stated in the monograph.

The following table includes results of examination of recent samples of phenol lozenges:—

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No. of sample	Average weight of the lozenges	Percentage of phenol found	Average weight in grammes in each lozenge	Average weight in grains in each lozenge
1 ..	1.3748 gm. = 21.21 gr.	2.068	0.0284	0.439
2 ..	1.2615 gm. = 19.46 gr.	2.352	0.0297	0.458
3 ..	1.042 gm. = 16.08 gr.	1.944	0.0203	0.313
4 ..	1.1791 gm. = 18.20 gr.	1.646	0.0194	0.299
5 ..	0.874 gm. = 13.49 gr.	1.868	0.0163	0.252
6 ..	1.2433 gm. = 19.18 gr.	1.745	0.0217	0.335
7 ..	1.0842 gm. = 16.73 gr.	2.324	0.0252	0.389
8 ..	1.0851 gm. = 16.74 gr.	1.876	0.0204	0.314
9 ..	1.1505 gm. = 17.75 gr.	1.723	0.0198	0.306
10 ..	1.194 gm. = 18.42 gr.	1.911	0.0228	0.352
11 ..	1.185 gm. = 18.28 gr.	2.068	0.0245	0.378
12 ..	1.164 gm. = 17.96 gr.	2.151	0.0250	0.386

The percentage of phenol in the bulked and crushed lozenges varies from 1.646 in the case of No. 4 to 2.352 for No. 2 and the average weight of phenol in each lozenge from 0.0163 to 0.0297 gram. Samples 1 to 6 were prepared on a small scale under laboratory conditions (dried at a temperature of about 35° C. for six hours), and show the average loss of phenol from the lozenges when prepared on a small scale. Samples 7, 8, and 9 were obtained from high-class pharmacies in the London area, and represent what is supplied normally for phenol lozenges. Samples 10, 11, and 12 are of special interest, as illustrating the phenol content of lozenges prepared according to the B.P. 1932. They were prepared from liquefied phenol of known strength, the mass was divided carefully to produce a lozenge of the correct weight and dried for eight hours at 30° to 35°, 50° and 60° C. respectively. From these three samples it appears that loss of phenol depends upon the rate of drying, since more rapid drying at 60° C. results in a smaller loss of phenol than drying more slowly at a lower temperature.

The authors suggest that a reasonable allowance should be made for loss of phenol during the manufacture of B.P. phenol lozenges. That the standard should be set on the percentage of phenol present, with a minimum weight for the lozenges, and not on the amount of phenol in each lozenge. The lozenges should be required to weigh not less than 1.10 and not more than 1.22 gram, and to contain not less than 1.75 per cent. of phenol.

SUMMARY

The determination of phenol in various medicaments is outlined, and its separation from other ingredients for determination by the Koppeschaar process is described. A distillation process for the quantitative separation of phenol is described in detail, and the process has been found rapid and accurate. It is recommended in most cases where a separation is necessary or advisable. The results of the analysis of tablets containing phenol show that the tablets are often deficient in phenol and that the loss is so great that it is advisable to discontinue their use as a nasal antiseptic tablet.

There was no discussion, but the CHAIRMAN, in thanking the authors, remarked that with all phenol lozenges some phenol was probably lost during storage.

The CHAIRMAN then called on Dr. F. W. Hampshire to read

The Determination of Phenol in Phenol Ointment

By E. M. SMELT, B.PHARM., PH.C.

[ABSTRACT]

THE determination of phenol with standard solution of bromine, as described under "Phenol" in the British Pharmacopœia, 1932, is found to be highly satisfactory for the assay of Phenol and Phenol Liquefactum. Assay processes for the other preparations of phenol included in the Pharmacopœia are required. In order to apply this process to the ointment and other preparations of phenol, it is necessary to extract the phenol in a form suitable for assay with bromine. Reference to the literature on the subject showed that the method generally employed is either distillation from acid solution, or direct extraction with alkali, or extraction from solution by shaking out with an immiscible solvent. In order to provide standard material a quantity was prepared according to the formula of the British Pharmacopœia, 1932, taking special precautions to avoid loss of phenol:—Phenol, 30 gm.; white beeswax, 75 gm.; lard, 50 gm.; hard paraffin, 75 gm.; white soft paraffin, 770 gm. By calculation from the weights taken the theoretical percentage of phenol in the ointment was found to be 2.97 per cent. This ointment was then used as a standard in carrying out the assay processes.

Process I.—This process was based on the process recommended by Thresh for carbolic acid gauze. About 15 gm. of the ointment, accurately weighed, was placed in a wide-mouthed flask and 300 mils of water, 10 mils of dilute sulphuric acid and a few fragments of granulated zinc were added. The flask was connected with a condenser and about 250 mils was distilled, the distillation being continued until the distillate ceased to give a precipitate with bromine water. The distillate was filtered in order to remove traces of fatty acids which collected on the surface. The filter was washed with water and the volume of the filtrate adjusted to 500 mils. The phenol in the solution was determined by the B.P. process, commencing with the words "Transfer 25 millilitres.". This process was found to possess the advantages that the phenol was obtained in a practically pure aqueous solution and that the operator was free to carry out other experiments during the distillation. The addition of zinc to the acid liquid produced smooth and steady boiling. The results obtained were:—(1) 2.93 per cent.; (2) 2.90 per cent. of C_6H_5OH.

Process II.—This process was based on the method used by Toth for the extraction of phenol from crude carbolic acid by solution in alkali. About 7.5 gm. of the ointment, accurately weighed, was warmed with 25 mils of $N/1$ sodium hydroxide until the ointment had entirely melted and an emulsion-like mixture was formed; the mixture was cooled under the tap, shaking continuously, and diluted with 25 mils of water; 50 mils of brine was added in order to "break" the emulsion and to obtain a clear aqueous solution; the clear solution was filtered off and the filter and precipitated ointment were washed with water until the filtrate ceased to give a precipitate with bromine water; the volume of the filtrate was adjusted to 250 mils. The filtrate was assayed by the B.P. process commencing with the words "Transfer 25 millilitres." The advantages of this method are that it can be rapidly carried out and that distillation is not necessary. The results obtained—(1) 2.96 per cent.; (2) 2.97 per cent. of C_6H_5OH—agreed very well with the calculated percentage.

Process III.—Approximately 3 gm., accurately weighed, was introduced into a wide-mouthed glass-stoppered bottle and 25 mils of $N/1$ sodium hydroxide was added; the stopper was replaced and the mixture warmed on a water bath until the ointment had entirely melted and an emulsion-like mixture was formed; the mixture was then cooled under the tap, with continuous shaking and diluted with 50 mils of water; 25 mils of a 2-per-cent. w/v solution of calcium chloride ($CaCl_2$ $6H_2O$) was added and the whole thoroughly mixed by shaking. The clear solution was filtered off and assayed by the B.P. process commencing with the words "Transfer 25 millilitres." Calcium chloride solutions of different strengths were tried, and the 2-per-cent. w/v solution was found to be just sufficiently strong to give a satisfactory separation with a clear aqueous solution. This process possessed similar advantages to Process II, and the results obtained with it were equally satisfactory:—(1) 2.95 per cent.; (2) 2.94 per cent.; (3) 2.97 per cent. of C_6H_5OH.

Process IV.—Approximately 6 gm. of ointment, accurately weighed, was introduced into a wide-mouthed, glass-stoppered bottle and 20 gm. of freshly slaked calcium hydroxide and 50 mils of water were added. The bottle was stoppered, heated on a water bath

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until the ointment had entirely melted, shaken thoroughly, and then cooled under the tap, with continuous shaking. After standing overnight the clear solution was filtered off and the filter and residue washed with water until the filtrate ceased to give a precipitate with bromine water. The volume of the filtrate was adjusted to 250 mils and assayed by the B.P. process, commencing with the words "Transfer 25 millilitres." This process, although simple and straightforward, took considerably longer than Process III. The results obtained were (1) 2.91 per cent.; (2) — C_6H_5OH. A modification of this process, substituting barium hydroxide for calcium hydroxide and using the "aliquot portion" method, was tried. Low results—(1) 2.81 per cent.; (2) 2.81 per cent.—were obtained, and since barium hydroxide appeared to possess no obvious advantages over calcium hydroxide, this method was not further investigated.

Process V.—About 3 gm. accurately weighed was warmed in a wide-mouthed flask with 10 mils of $N/1$ sodium hydroxide until the ointment had entirely melted. The mixture was then transferred to a separator, the flask was washed with 40 mils of warm water, added in small quantities, and the washings were mixed with the liquid in the separator. The whole was then cooled under the tap, shaking continuously, and sufficient sodium chloride to saturate the solution was added. The mixture was then shaken with 50 mils of light petroleum (b.p. 50° to 60° C.) and allowed to separate. The aqueous solution was drawn off and filtered into the measuring flask. The light petroleum solution was washed first with 30 mils and then with successive quantities of 20 mils of water until the aqueous layer gave no precipitate with bromine water. The solution was made up to 100 mils with the filtered washings, and the phenol was determined by the B.P. process commencing with the words "Transfer 25 millilitres." There was a tendency to form emulsions during the extraction of the phenol, and the results—(1) 2.79 per cent. and (2) 2.86 per cent.—did not agree sufficiently well to merit further investigation of this process. An iodometric method for the determination of phenol in Phenol Ointment, described by Elsdon in a paper at the British Pharmaceutical Conference in 1920, was tried. By this method, 0.5 gm. of the ointment, dissolved in chloroform, is boiled with $N/10$ sodium carbonate, and excess of $N/10$ iodine is allowed to react with the cooled solution for not more than five minutes, and the excess of iodine is then determined by titration with $N/10$ sodium thiosulphate. This method was found to give variable results which appeared to be caused by loss of phenol during the boiling with $N/10$ sodium carbonate.

From the point of view of rapidity and simplicity in manipulation Process III is recommended, but Process I may well be preferred on account of avoiding complications due to the use of unnecessary reagents. Similar investigations are proceeding with a view to defining essay processes for the suppositories, the glycerin and the lozenge of phenol. Dr. C. H. Hampshire and Mr. T. Tickle are thanked for very helpful suggestions and criticism.

Summary

The determination of phenol with standard solution of bromine having proved satisfactory for the assay of Phenol and of Liquefied Phenol, the application of the process to the assay of Phenol Ointment was investigated. Several processes for the extraction of the phenol from the ointment in a form suitable for titration with bromine were tried. Two methods are recommended as giving satisfactory results—(*a*) distillation from acid solution, (*b*) solution in $N/1$ sodium hydroxide, and separation of the phenol solution from the ointment base by means of calcium chloride.

Discussion

Mr. Corfield said he had examined many samples of phenol ointment of the B.P. 1914 for phenol content, and one could obtain very accurate results by a process of extraction with sodium hydroxide and for smaller proportions the distillation method described in the previous paper. In his opinion method I was not a good method, and results would probably show that the method was likely to give inaccurate results.

Mr. Storey said he greatly appreciated the author's paper.

Mr. Titterington said he had the same difficulty in storing coal tar products in a hot climate.

Dr. Tocher mentioned that figures obtained by him in 1901 agreed with the method of the new British Pharmacopœia.

Mr. Fouracre wondered if the ointment had become more caustic with the omission of the glycerin from the formula.

Dr. Hampshire thanked the speakers on behalf of the author. The formula had been tested clinically and no disadvantage had accrued from the omission of the glycerin.

The next communication, taken as read, was

The Determination of Bismuth in Solution of Bismuth and Ammonium Citrate

By C. T. Bennett and N. R. Campbell

[Abstract]

After reviewing the existing methods of assay the authors state that an application to the assay of the B.P. solution, of the method of Schoeller and Waterhouse for the estimation of bismuth by precipitation as phosphate was sought, and the following adopted:—

Take 10 mils and dilute to 100 mils with water. Of this dilution take 25 mils, add 50 mils of water and sufficient nitric acid to produce a precipitate and then to redissolve it. Add 25 mils water and strong ammonia until a faint permanent precipitate is obtained, then add 2 mils of nitric acid and heat to boiling. Add to solution maintained at boiling temperature a 10-per-cent. solution of ammonium phosphate from a burette at a rate of about 30 drops per minute until the bismuth is all precipitated. Then add the remainder more quickly until 40 mils have been added. Stirring must be continued throughout. Dilute to about 400 mils with boiling water, stir and allow to settle for fifteen minutes on a water bath. Filter on a Gooch crucible charged with asbestos, under reduced pressure. Wash three times by decantation, then filter with 3-per-cent. solution of ammonium nitrate containing a few drops of nitric acid. Dry for thirty minutes in water-oven and ignite gently within a larger crucible. Each gramme of the residue corresponds to 0.7654 gm. of Bi_2O_3.

1 gm. of $BiPO_4$ 0.7654 gm. of Bi_2O_3

This process takes less than one and a half hours for completion. The precipitate is of definite composition, remaining so on ignition; the precipitate comes down quickly, settles well and does not attack the somewhat delicate structure of the Gooch crucible on ignition. Filtration is surprisingly rapid even when a small water-pump is employed and the final ignition does not require a high temperature, or continued heating.

Two results on a liquor, carefully standardised by the B.P. 1914 process, gave 5.00 and 5.01 gm. of bismuth oxide in 100 mils.

Discussion

Mr. Evers said he did not see why the phosphate method was not used.

The Chairman expressed the appreciation of the meeting to the authors.

(*To be continued.*)

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Social Echoes

The pharmaceutical invasion of Scotland began in earnest a fortnight ago, for many of the brethren, their wives and families had been touring the North Country prior to concentrating on Aberdeen. The first influx of visitors to the Granite City appeared on Saturday, September 10, the earliest arrivals being Mr. and Mrs. D. J. Williams, of Bath, Dr. C. H. Hampshire, with Mrs. Hampshire and their daughter (from Edinburgh), Mr. A. H. Jenkin, and a party of about sixteen from Belfast. Among the Irish contingent were Mr. and Mrs. Fred Storey, Mr. D. L. Kirkpatrick, Mr. and Mrs. S. Gibson, Mr. J. E. Connor, Mr. S. H. Forrest and Mr. A. C. McBride. From Liverpool came Mr. and Mrs. Humphreys Jones as an advance guard for a party of about twelve to follow later.

* * * *

Next day Mr. and Mrs. R. R. Bennett arrived with their son, after a motor tour through the Lake District, up the West Coast of Scotland from Oban by Fort William to Inverness, and thence to Aberdeen. On the same day Mr. and Mrs. C. A. Noble motored up from Edinburgh, where they had been spending a few days after a tour through the Lake District. By midday on Monday hundreds more arrived from all parts of the country, all more or less enthusiastic about the glories of Scotland and the kindness of the weather. In the language of gentlemen of the B.B.C., the weather has been "mainly fair with bright intervals; occasional heavy showers in certain districts."

* * * *

Ex-Provost Roderick Smith, of Stornoway, a delegate from the North of Scotland Branch, had the distinction of arriving at the Conference by air from Stornoway. Ex-Provost Smith told us that he had an excellent flight, travelling sometimes on a level with the peaks of the mountains. It is interesting to note that he has missed only five Conferences in the past twenty years.

* * * *

During the week-end those visitors who had already arrived made the most of their opportunities. More than one party went to Banchory and saw one of the most delightful parts of Lower Deeside. A Lancashire group made this journey, and after having inspected this Deeside burgh went to the Water of Feugh, about a mile away, and from the ancient bridge watched with interest the salmon journeying up the stream through the rapids. On their return to Aberdeen they made their way to the beach, where they found other Conference visitors enjoying the exhilarating sea breezes.

* * * *

The same group took a journey to Alford, about thirty miles from Aberdeen. Turning north, they ascended the Correen Hills, where the road rises to a height of nearly 1,300 feet. There, amid the heather and bracken, they enjoyed an extensive view. Thence they proceeded eastward, descending from the moorland and passing the Castle of Dunnideer on their way to Insch. The return journey was by way of Inverurie and Kintore.

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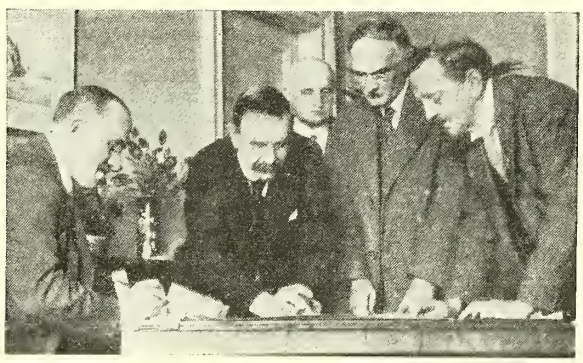
A reception and dance, given by the Lord Provost, magistrates and Town Council of Aberdeen, in the Art Gallery and Cowdray Hall, marked the opening of the Conference, which will rank as one of the most enjoyable of recent years. The guests were welcomed by the Lord Provost, who was accompanied by Lady Provost Rust and Baillies Watt, Swinney and Robertson. After the company was seated (and the seating capacity of the Gallery was taxed to the utmost), the Lord Provost offered a happily worded welcome. He described some of the beauties and places of historic interest in the city, and remarked that chemists were not as other men. The dignity, serenity and manner of members of that profession inspired confidence. He thought that if he had to start life again and had the opportunity of choosing a career, he would give that of a chemist his consideration. Mr. Herbert Skinner (chairman of the Conference), in reply, said that Aberdeen, with its stories, had much in common with chemists. Mr. F. Gladstone Hines (president of the Pharmaceutical Society) also acknowledged the Lord Provost's welcome. The company was entertained during the first part of the evening by an excellent male choir and an orchestra. Dancing in the Cowdray Hall followed.



Photo] [*Cleworth*

PLANNING THE CONFERENCE BANQUET.

Left to right: Messrs. Farquhar, Hay, Dugan, and two visitors.

After the municipal welcome and the Chairman's address on Tuesday morning, many of the ladies took the opportunity to visit some of the sights of the city under the guidance of the local ladies' committee. Those who climbed the Mitchell Tower of the Marischal College were duly rewarded for their energy by a magnificent view of the city and surroundings. The College itself, with its libraries, its museum, and, above all, its glorious stained-glass window, sufficed for the less energetic. The fine shops of Union Street came in for more than a little share of attention and admiration, and the beach, with its wide vista of sand and North Sea, was a favourite rendezvous.

* * * *

The fascinating description of Dunottar Castle by Dr. Douglas Simpson which appeared in a recent issue of the *C. & D.*, and the note by Mr. William Watt on the route thereto, stimulated interest to such an extent that the science meeting and even the delegates' gathering were rather meagrely attended. Over three hundred were conveyed in the luxurious coaches on Tuesday afternoon by "Finnan" and "Stanehive" to the imposing ruin built on a rock jutting out into the North Sea. Thanks to the late Viscountess Cowdray, a grassy pathway has been made and kept, so that one may walk

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from the main road on to the promontory on which was built in ages past the fortress of Dunottar. Owing to recent rain, some parts of the pathway on the slope were rather slippery, and at least two twisted ankles resulted—but nothing serious. Dr. Simpson gave an extremely interesting and graphic lecture on the history of the Castle, and the novelty of having an excellent tea amid the ruins of an ancient civilisation was welcome. The organisation of such an outing in unusual surroundings was a distinct tribute to the all-round ability of the local committee and especially to the ladies), for (with the exception of the sprained ankles aforesaid) there was no hitch. The company arrived back in Aberdeen about six o'clock, in good time for the reception and dance at the Marischal College.

* * * *

The Mitchell Hall of Marischal College was the scene of Tuesday night's social event. A large crowd attended, and from appearances everyone thoroughly enjoyed themselves. During intervals in the dancing the company was charmed by the evolutions of a troupe of well-trained highland dancers, whose demonstration included the Eightsome Reel and the Sword Dance. This beautiful hall lends itself admirably to dancing. A good view of the ballroom floor could be obtained from the excellent gallery, and—happy thought—accommodation was found for card games in an adjoining hall.

* * * *

As chairman of the Conference, Mr. Skinner repeated, *mutatis mutandis*, his personal triumphs at Brighton and Cheltenham in 1927 and 1928 respectively, when he was president ot the Pharmaceutical Society. Fresh from the Canadian-American Convention, he was able to compare mentally the home and the colonial methods of conducting such functions—not always, it may be hoped, to the disadvantage of Great Britain. This year's Conference owes much to his experienced guidance of its general and sectional meetings.

* * * *

The Conference banquet was held in Elphinstone Hall on Wednesday, Mr. Herbert Skinner (chairman of the Conference) presiding. After the loyal toast, Professor David Campbell (Professor of Materia Medica in the University of Aberdeen) proposed the toast of "The Pharmaceutical Society of Great Britain." Professor Campbell stressed the importance of education to the future of pharmacy, a matter which leaders of the craft realised. Mr. Hines (president of the Society), in reply, thanked Professor Campbell for his remarks. Education had been the key-note of the Conference. The president conveyed messages of regard from pharmacists in Canada and the United States, where as president he had been received with every kindness. He contrasted pharmacy in Canada with that on this side of the Atlantic, and urged need for establishing some control of medicinal products. He returned with great pride in British prestige. The tradition of the mother Society should always be that of leader of pharmacy, so far as English-speaking nations were concerned.

* * * *

Professor Alexander Findlay (Professor of Chemistry, Aberdeen University) proposed "The British Pharmaceutical Conference." He acknowledged the great contributions to chemical science by those interested in the investigation of drugs, and expressed the hope that the Conference would give encouragement to the study of the history of pharmacy. He suggested that every retail business should have attached a laboratory for research under the auspices of the Conference. Mr. Skinner, replying, said the Conference represented those keenly interested in the progress of pharmacy, and this was evidence of the spirit of research on which medicine must be built; pharmacy was a branch of medicine, the two going hand in hand. The new Pharmacopœia would be an eye-opener to medical men.

* * * *

This was the first time pharmacists had had a real helping hand in the production. Many in the ranks were giving their best for pharmacy and medicine. The price of progress was eternal vigilance. Mr. R. R. Bennett proposed "The Town and Gown." Bailie Watt and Colonel H. J. Butchart replied for the City and University respectively. "Our Guests" was proposed by Dr. J. F. Tocher, and responded to by Mr. J. G. Burnett, M.P. for North Aberdeen. Lady Adam Smith expressed the personal regret of the Principal of the University at his unavoidable absence in the United States.

Photo] [*Cleworth*

SEEN IN ABERDEEN

Left to right: Messrs. Currie, McVitae, and Maclennan

The work of the Local Executive Committee was unusually arduous this year by reason of the very large number of applications for tickets. The sudden increase in the pharmaceutical popularity of Aberdeen is somewhat difficult to explain, but it has entailed more work than, probably, the devoted ladies and gentlemen who formed the Local Executive Committee and its subsidiary committees expected when they first entered their names. How efficiently and heartily this work has been done, every visitor to the Conference knows; and the compliments that have been paid to Mr. Hay, Mr. Dugan and their colleagues are a slight expression of the gratitude that is their due.

* * * *

Judging from the first newspaper cuttings that have reached us, the local Press "did" the Conference very well, both the "Aberdeen Press and Journal" and the "Evening Express" giving lengthy reports of the opening session and the earlier social events. One of these journals remarks:—"With one exception all the papers submitted at the science meeting of the Conference were of a highly technical nature. While, however, they might have been more or less unintelligible to the outsider, they were of profound interest to the delegates."

Trade Report

Where possible scales of prices of chemicals are given for bulk down to small quantities. Prices recorded for crude drugs, essential and fixed oils and coal tar products are for fair sized wholesale quantities. Qualities of chemicals, drugs, essential and fixed oils, etc., vary, and selected brands or grades would be at higher values

28 Essex Street, W.C.2, September 15

ALTHOUGH the volume of business transacted during the past week has been rather disappointing, the general tone is steadily maintained. A few of the items of a speculative character have declined in value, due to profit-taking. The steadiness of the markets, despite the temporary falling-off in demand, indicates the healthy undertone. In pharmaceutical chemicals, business has been sustained on the recent limited lines and prices are generally steady. Fixed prices for phenolphthalein are now operating and there is not much second-hand to clear. Thymol is steadier. Home makers have reduced their quoted prices for tartaric acid, cream of tartar and citric acid. In crude drugs, matters have been somewhat quieter, but there is no general tendency for prices to move back to former levels. Buchu is firm. Japanese camphor and menthol have been slow and are not so healthy. Cascara sagrada is firm. Ipecacuanha is dearer and firm. Alexandrian senna pods of manufacturing quality have been active for export. Honey is increasing in demand on a strong market. In essential oils, business has been rather patchy, with prices well maintained. Some few products are slightly dearer. The shipment markets in crude drugs and essential oils are, with a few exceptions, fully steady, with a tendency to advance. In fixed oils, business has shown a good revival and prices are recovering sharply. The tone is very steady, and further advances are looked for. Coal-tar products are mostly rather quiet. Carbolic acid crystals are active at steady prices, and pitch is firm and scarce for export.

A drug auction will be held next Thursday, September 22.

Exchange Rates on London

THE following is a list of the chief Continental and other exchango rates at the opening on Thursday morning:—

Centre	Quoted	Par	September 15	Value of the £
Amsterdam ..	Fl. to £	12.107	8.67	14/3¾
Berlin	Mks. to £	20.43	14.62½	14/3¾
Brussels ..	Belga to £	35	25.12½	14/4¼
Copenhagen ..	Kr. to £	18.159	19⅝	21/2¾
Lisbon ..	Esc. to £	110	110	20/0
Madrid ..	Ptas. to £	25.22½	43¼	33/10½
Milan	Lire to £	92.46	67⅞	14/6
Montreal ..	Dol. to £	4.86⅝	3.85½	15/10¼
New York ..	Dol. to £	4.86⅝	3.48	14/3¼
Oslo	Kr. to £	18.159	19⅝	21/10½
Paris	Fr. to £	124.21	88⅝	14/3¼
Prague ..	Kr. to £	164.25	117½	15/1½
Stockholm ..	Kr. to £	18.159	19.50½	21/6
Warsaw ..	Zloty to £	43.38	31½	14/5
Zurich.. ..	Fr. to £	25.2215	18.04	14/3¼

Bank rate 2 per cent.

Pharmaceutical Chemicals, etc.

BUSINESS continues to move on a fairly satisfactory scale and prices are all very steady. Phenolphthalein is dearer, with sales prices now fixed. Thymol is steadier. Milk sugar is tending to advance. Home makers have reduced their quoted prices for cream of tartar and tartaric and citric acids.

ACETANILID meets with the usual small business; market steady: B.P. crystals and powder, 1s. 5½d. to 1s. 8d. per lb. as to quantity.

AMIDOPYRIN.—Dealers' spot prices are slightly cheaper than forward: crystals, two cwt., 18s. 2d.; less than two cwt., 18s. 6d. per lb., with powder 2d. per lb. extra.

AMMONIUM ICHTHOLSULPHONATE is unchanged, with business fair: one cwt., 1s. 6d., in 14-lb. tins; 1s. 7d., in 1-lb. tins; 1s. 9d., in 8-oz. tins; and 1s. 11d. per lb., in 4-oz tins.

ASPIRIN.—Inquiry continues on a good scale, with makers' and dealers' prices steady. Home trade: ten cwt., 2s. 7d.; five cwt., 2s. 8d.; one cwt., 2s. 8½d.; 28 lb., 2s. 9d.; 14 lb., 2s. 10d.; 7 lb., 3s. per lb. Export to Colonies and British Possessions: ten cwt., 2s. 7d.; five cwt., 2s. 8d.; one cwt., 2s. 8½d. per lb. f.o.b.; less than one cwt., 2s. 9d. per lb. ex works.

BARBITONE.—Spot offers continue cheap compared with replacement costs: spot, one cwt., 10s. 9d.; 56 lb., 11s.; smaller parcels, up to 11s. 3d. per lb.

BENZOIC ACID (B.P.) is meeting with a steady inquiry: quantities, ex works, 1s. 9½d.; spot parcels, 1s. 10d. to 2s. per lb. ex store.

BROMIDES.—Makers' prices are sustained, with dealers offering at level figures; business is fair: ammonium, not less than five cwt., 1s. 9d.; one cwt., 1s. 10d.; smaller quantities, 2s. 1d. per lb.; potassium, B.P. crystals and granular, not less than five cwt., 1s. 6d.; one cwt., 1s. 7d.; smaller quantities, 1s. 10d. per lb.; sodium, B.P., not less than five cwt., 1s. 8d.; one cwt., 1s. 9d.; smaller quantities, 2s. per lb., net, without engagement. Special prices for larger quantities.

CAFFEINE.—Competitive prices continue to be quoted for a limited business: pure alkaloid, 5s. 8d. to 6s. 2d. per lb.; citrate, 4s. 4d. to 4s. 8d. per lb., as to quantity.

CALCIUM LACTATE.—The market is rather quiet; quoted values unchanged: spot, one cwt., 1s. 1d.; 56 lb., 1s. 2d.; 28 lb., 1s. 2½d.; smaller parcels, up to 1s. 6d. per lb.

CHLORAL HYDRATE.—Home makers' prices are steady: duty-paid crystals, in 14-lb. free containers, five cwt., 3s. 4d.; one cwt., 3s. 5d.; 56 lb., 3s. 6d.; 28 lb., 3s. 7d.; 14 lb., 3s. 8d. per lb.; 28-lb. jars, one penny per lb. extra.

CITRIC ACID (B.P. CRYSTALS).—Home makers notify a reduction in their quoted price to 10¼d. per lb., less 5 per cent. discount, nominal and without engagement. Dealers are quoting at very keen prices.

CREAM OF TARTAR.—Home makers' quoted price for 99 to 100 per cent. has been further reduced, and is now at 85s. per cwt., less 2½ per cent. discount, nominal and without engagement. Dealers' prices are at about the same level.

CREOSOTE CARBONATE.—Dealers are offering spot supplies at about 8s. 6d. to 10s. per lb., as to quantity. Market is dull.

GUAIACOL CARBONATE.—The demand is small. Dealers quote spot: one cwt., 8s.; 56 lb., 8s. 1d.; 28 lb., 8s. 2d.; smaller parcels, up to 8s. 6d. per lb.

HEXAMINE.—There is no change in the gold standard prices, as previously reported. Spot supplies are offering at keen prices: two-cwt. lots, 2s. 5d.; one cwt., 2s. 3½d.; up to 2s. 6d. per lb. for small quantities.

HYDROQUINONE is unchanged, with importers' prices steady; business rather quieter: ten cwt., 4s. 8¾d.; five cwt., 4s. 9¼d.; two cwt., 4s. 10¼d.; one cwt., 4s. 10¾d.; 56 lb., 4s. 11¾d.; 28 lb., 5s. 1¾d.; 14 lb., 5s. 3½d.; 7 lb., 5s. 5½d. per lb., carriage paid.

IODIDES.—Makers' prices are as follows: Potassium iodide, B.P.: For not less than one cwt., 17s. 10d.; 28 lb., 18s. 1d.; 14 lb., 18s. 4d.; 7 lb., 20s. 9d.; 4 lb., 21s. 2d.; smaller quantities, 21s. 7d. per lb. Sodium iodide, B.P.: For not less than 28 lb., 19s. 4d.; 14 lb., 19s. 10d.; 7 lb., 22s. 10d.; 4 lb., 23s. 3d.; smaller quantities, 23s. 9d. per lb. Iodine resub., B.P.: For not less than one cwt., 20s. 8d.; 28 lb., 20s. 11d.; 14 lb., 21s. 5d.; 7 lb., 23s.; 4 lb., 24s. 2d.; smaller quantities, 26s. per lb. Iodoform, B.P. cryst., precip, or powder: For not less than 28 lb., 23s. 9d.; 14 lb., 24s. 3d.; 7 lb., 28s. 1d.; 4 lb., 28s. 8d.; smaller quantities, 29s. 3d. per lb. In quantities not less than one cwt., (which may be taken assorted), containers of 28 lb. and outer packages free, carriage paid. Prices are quoted without engagement. Contracts for one cwt., five cwt., ten cwt., or larger quantities, for delivery as required during a period of four months, with rebates applicable to the quantity booked.

LACTIC ACID (B.P.) meets with a moderate inquiry, with quoted prices competitive: quantities in carboys, 1s. 5½d. to 1s. 6½d. per lb.; small lots in demijohns and winchesters, 1s. 7d. to 1s. 8½d. per lb., carriage paid.

METHYL SALICYLATE (B.P.).—Business continues on a very fair scale, with makers' and dealers' prices steady; one

ton and over, 1s. 4½d.; ten cwt., 1s. 5d.; five cwt., 1s. 5½d.; one cwt., 1s. 6d.; less than one cwt., 1s. 6½d.; smaller quantities in bottles, up to 2s. per lb.

METHYL SULPHONAL remains rather quiet, but dealers' prices are steady: spot, two cwt., 19s. 3d.; one cwt., 19s. 9d.; 56 lb., 20s. 3d.; small parcels, up to 21s. per lb.

METOL shows no change, with business on limited lines: 56 lb., 9s. 3d.; 28 lb., 9s. 6d. per lb.; 14 lb., 9s. 9d.; 7 lb., 10s. 9d. per lb., in tins, bottles extra, carriage paid. Wholesale distributors' prices for small quantities at higher prices.

MILK SUGAR.—Rather more business is being done and the market tends to harden: Continental material, one ton, 50s. 6d.; ten cwt., 51s. 6d.; two cwt., 52s. 6d. per cwt., in two-cwt. cases.

MORPHINE.—Makers' prices are as follows:—

	Under 5 oz.	5 oz. and over assorted	For 100 oz. assorted contracts over 6 months	For 250 oz. assorted contracts over 6 months
Morphine:	oz.	oz.	oz.	oz.
alkaloid precip.	23/2	22/1	21/7	21/1
mecenate				
tartrate (neutral)				
acetate				
hydrochloride powder ..	18/8	17/10	17/4	16/10
sulphate				

Fall clause for contracts of 100 oz. and over.

PHENACETIN.—Dealers' spot prices are keen, and isolated offers are cheap compared with forward; spot, crystals, ten cwt., 5s. 4½d.; five cwt., 5s. 6d.; two cwt., 5s. 7d.; and less, up to 6s. 3d. per lb., with powder 2d. per lb. extra.

PHENAZONE.—There appear to be one or two cheap spot offers, but in most directions the market is steady: spot, crystals, ten cwt., 9s. 7½d.; five cwt., 9s. 10d.; two cwt., 10s.; and less, 10s. 4½d. per lb., with powder 2d. per lb. extra.

PHENOLPHTHALEIN.—The two home sources of supply are now quoting the following scale of prices: five cwt. and over, 3s. 10d.; two cwt., 3s. 11d.; one cwt., 4s.; 28 lb., 4s. 3d.; 14 lb., 4s. 6d.; 7 lb., 4s. 9d. per lb.; small lots, 5s. per lb. There is very little second-hand on the market.

POTASSIUM PERMANGANATE (B.P.).—The demand for limited quantities continues, with the market steady: quantities in drums, 8½d. to 9d.; druggists' parcels, 9¼d. to 10d. per lb.

POTASSIUM SULPHOGUAIACOLATE is a dull market. Dealers are offering spot supplies at about 4s. 9d. to 5s. per lb., as to quantity.

QUININE SULPHATE.—The Convention quotation remains at 2s. 4d. per oz., carriage paid on bulk quantities.

RESORCIN.—Business is fairly good: market steady: crystals, one cwt., 4s. 6d.; 56 lb., 4s. 7d.; 28 lb., 4s. 8d.; 14 lb., 4s. 10d.; 7 lb., 5s.; less than 7 lb., 5s. 6d. per lb., with powder 3d. per lb. extra.

ROCHELLE SALTS.—Makers' prices are steady: powder, five cwt. or over, in one delivery, 82s. 6d.; less than five cwt., 85s.; less than one cwt., 87s. 6d. per cwt., carriage paid; crystals, 2s. 6d. per cwt. extra; pulv. seidlitz, five cwt. or over, in one delivery, 66s. 3d.; less than five cwt., 68s.; less than one cwt., 70s.: double, 73s. 3d., 75s. 6d. and 77s. 6d. per cwt., carriage paid. Special prices for quantities and contracts.

SALICYLIC ACID (B.P.) continues firm at home makers' prices: one ton, 1s. 5d.; ten cwt., 1s. 5½d.; five cwt., 1s. 6d.; one cwt., 1s. 6½d.; small parcels, up to 2s. per lb.

SALOL is unchanged at controlled prices; business limited: crystals, two cwt., 5s. 2¾d.; one cwt., 5s. 4¾d.; 56 lb., 5s. 6d.; smaller parcels, 5s. 7½d. per lb.; powder, 2d. per lb. extra.

SANTONIN.—The market continues competitive, with prices a matter of negotiation.

SODIUM BENZOATE (B.P.) is moving fairly well on a very keen market: bulk quantities, about 1s. 7d.; cwt. lots, 1s. 7½d.; smaller parcels, up to 2s. per lb.

SODIUM DIETHYLBARBITURATE.—The market has remained dull: spot, one cwt., 12s. 9d.; 56 lb., 12s. 10d.; 28 lb., 13s.; 14 lb., 13s. 2d.; 7 lb., 13s. 3d.; smaller parcels, up to 13s. 9d. per lb.

SODIUM SALICYLATE (B.P.).—A very fair business is being done, with makers' and dealers' prices steady. Home trade: powder, two tons, 1s. 10d.; one ton, 1s. 10½d.; ten cwt., 1s. 11d.; five cwt., 1s. 11½d.; one cwt., 2s.; 28 lb., 2s. 1d.; 14 lb., 2s. 3d. per lb., with crystals 1d. per lb. extra.

SULPHONAL.—Business has been limited; dealers' prices continue steady: crystals, two cwt., 15s. 7d.; one cwt., 16s.; 56 lb., 16s. 3d.; small parcels, up to 17s. per lb., with powder 2d. per lb. extra.

TANNIC ACID (LEVISS).—Prices are maintained at the recent advance at 3s. 6d. to 3s. 9d. per lb. as to quantity.

TARTARIC ACID (B.P. CRYSTALS).—Home makers' quoted price shows a reduction, being now at 11d. per lb., less 5 per cent. discount, nominal and without engagement. Dealers are quoting at keen prices.

THEOBROMINE.—The market is fairly steady, although business is small: pure, 5s. 6d. to 5s. 9d.; sodium salicylate, 5s. 3d. to 5s. 6d. per lb., as to quantity.

THYMOL.—The market is steadier; business is limited: synthetic, fine white, one cwt., 6s.; 56 lb., 6s. 1½d.; 28 lb., 6s. 3d.; 14 lb., 6s. 4½d. per lb.; ex ajowan seed, one cwt., 7s. 6d.; 56 lb., 7s. 7½d.; 28 lb., 7s. 9d.; 14 lb., 8s. per lb.

VANILLIN.—Business is on the quiet side; some offers may be slightly cheaper: ex guaiacol, one ton, 14s. 3d.; ten cwt., 14s. 6d.; five cwt., 14s. 9d.; three cwt., 15s.; one cwt., 15s. 3d.; 56 lb., 15s. 6d.; 28 lb., 15s. 9d.; 14 lb., 16s.; less, 16s. 3d. per lb.; ex clove oil, 16s. to 18s. per lb., as to quantity, from one ton to less than 14 lb.

Crude Drugs, etc.

AGAR-AGAR.—The market is keeping quite steady but business has been slower. Spot, Kobe No. 1, 2s. 11d.; No. 2, 2s. 9d.; Yokohama No. 1, 2s. 9d.; shipment, Kobe No. 1, 2s. 2d.; No. 2, 1s. 10d.; Yokohama No. 1, 1s. 10d. per lb. c.i.f.

ANTIMONY is steady at last week's prices. Chinese crude, spot, £16; shipment, £14 5s. c.i.f. Chinese oxide, spot, £27; shipment, £20 10s. c.i.f.

BALSAMS have remained rather dull but keep steady. *Tolu*, 3s. 6d. per lb. *Canada* is offering at about 3s. 6d. to 3s. 8d. per lb., spot.

BUCHU.—This market is fully steady and holders are not forcing sales: business is moving on a limited scale. Spot, good green rounds, where available, firm at 1s. 3d.; fair, 1s. 1d. to 1s. 1½d.; off colour, 11d. to 1s. per lb. Ovals, 9¼d. to 9½d. per lb., as to colour.

CAMPHOR.—The market has been subdued, but prices for Japanese continue about unchanged but not so steady. Spot, slabs, 2s. 4½d.; tablets, 3s. per lb.; shipment, slabs, 1s. 9¾d.; flowers, 1s. 10¼d.; tablets, 2s. 3½d. per lb. e.i.f. English refined is quoted unchanged: flowers, one cwt., 3s. 1d.; 28 lb., 3s. 2d.; small lots, 3s. 3d. per lb. Transparent tablets, 4 oz., 8 oz. and 16 oz., 3s. 4d.; 1 oz. and 2 oz., 3s. 5d.; ½ oz., ⅓ oz. and ¼ oz., 3s. 6d. per lb.; special prices for contracts for quantities.

CASCARA SAGRADA.—The recent advances are well maintained, and business has been satisfactory: the market is fully steady. Shipment, 42s. 6d. per cwt., c.i.f. in carload lots; spot, 1931 peel, 57s. 6d.; 1932 peel, from 50s. per cwt.

CHAMOMILES.—The position as regards new crop flowers continues uncertain, and it is difficult to obtain definite news. It is reported that one or two exporters are behind with their shipments. One report states the crop is finished and the yield is much less than was at first estimated.

CLOVES—Quoted prices are steadily maintained, but business is rather quiet at the moment. Zanzibar, spot, 7¾d.; shipment, August-October, 7d. per lb. c.i.f. Madagascar, spot, 7¾d. per lb.

The landings of Zanzibar in London during the week ended September 10 were *nil* and the deliveries 111, leaving a stock of 1,112, against 647 in 1931. From January 1 to date landings of Zanzibar have been 4,401, against 1,541 in 1931, and the deliveries 5,276, against 1,913 in 1931. Landings of Madagascar for the week ended September 10 were *nil* and the deliveries six, leaving a stock of 1,463, against 1,169 in 1931. Landings of Madagascar this year to date have been 814, against 2,320 in 1931, and the deliveries 358, against 2,037 in 1931.

COCOA BUTTER.—The market is better this week with prime English quoted from 9d. to 10½d. per lb., as to quantity.

COCONUT (DESICCATED).—The market is steady and unchanged on the week. Spot, fine, 24s.; medium, 23s. 6d.; shipment, halves, September-October, 21s. 6d. per cwt., c.i.f.

COD-LIVER OIL.—The seasonal demand has been increased in view of the possibility of an additional import duty. The shipment market is firm with finest Lofoten steam-refined, non-freezing medicinal oil at 87s. 6d. per barrel, c.i.f. Spot is quoted from 100s. to 102s. 6d. per barrel. Some brands may be slightly cheaper.

COLCHICUM.—Best sliced root is now quoted at 65s. per cwt., and seed is dearer and firm at 2s. 6d. per lb.

ERGOT.—Russian continues to be freely offered on spot at about 1s. 2½d. to 1s. 3d. per lb., as to quantity. New crop Spanish for shipment is mentioned at about 1s. 5d. per lb. c.i.f.

GELATIN.—A fair business continues with the market steady. Spot, gold leaf, 2s. 2d.; silver leaf, 2s.; bronze leaf, 1s. 8½d.; thin leaf, 1s. 7½d. per lb. in cwt. cases.

GENTIAN.—Supplies available on spot are limited, and the price is firm at 45s. per cwt.

GINGER has been in fair demand; prices are fully maintained. West African, spot, 23s. 6d.; for arrival, 22s. 6d. per cwt., c.i.f. Jamaica is dearer on spot at from 62s. 6d. to 95s. per cwt., as to quality. This shows an advance of about 5s. per cwt.

GUM ACACIA.—A little more interest has been shown, and the market is quoted a point dearer. Spot, Kordofan cleaned sorts, 38s.; natural, 36s.; bleached, 77s. 6d. per cwt. Shipment, Kordofan cleaned sorts, 32s.; natural, 30s. per cwt. c.i.f.

HENNA LEAVES.—Supplies on spot are still rather free, and are moving off at previous rates.

HONEY.—With the approach of the buying season business has increased and the demand has been more active than usual in view of the increased rate of import duty that is likely to be levied at no distant date. Californian white clover is now up to 50s. per cwt. On account of the attractive price Hamburg has been buying in good quantities, some 250 cases of Guatemalan being sold at an advance of 2s. Jamaican pale is in very limited supply on spot. Good medium is quoted at about 35s. per cwt., and dark manufacturing at about 25s. 6d. to 27s. 6d. per cwt. It is reported that the Jamaican crop was unusually poor this season. The general tone of the market is firm.

IPECACUANHA.—The spot market is now firm, with Matto Grosso fully 5s., and some holders asking up to 5s. 3d. per lb. Supplies are restricted on spot and no offers for shipment are being made.

LIQUORICE ROOT.—It is reported there is no single-peeled root available.

MENTHOL.—After a week of slower business the shipment market is rather easier, but is keeping quite steady. K/S brands on spot is nominal at 11s. 9d. per lb., and less for bulk quantities; shipment, October-December, about 9s. 7½d.; January-March, 9s. 7½d. per lb. c.i.f. Closing dull but steady.

MERCURY.—The market is fairly busy and the spot value is steady at about £10 to £10 7s. 6d. per bottle, ex warehouse, as to quantity.

OPIUM.—The market has been rather quiet but is very steady at 1s. 4d. per unit, landed and duty paid.

PEPPER.—Quoted prices show very little change on the week; the market is rather quiet but steady. Lampong, spot, 6⅜d.; shipment, August-October, 5½d.; October-December, 5 9/16d. per lb. c.i.f. Tellicherry, spot, 7½d.; shipment, September-November, 65s. per cwt. c.i.f.; Aleppy spot, 7d.; shipment, September-November, 61s. per cwt. c.i.f. White Muntok, spot, 7½d.; shipment, August-October, 6½d. sold; October-December, 6⅝d. paid, c.i.f.

PIMENTO.—At the further advance the market is firm and business active. Spot, 3¾d.; shipment, September-October, 32s. 6d. per cwt. c.i.f.

RUBBER.—The market lost ground early in the week but recovered at the close, and is now steady with more business moving. U.K. stocks total 104,290 tons, as against 105,062 tons last week and 135,802 tons a year ago. Standard ribbed smoked sheet, sellers, spot, 2⅜d.; September, 2¾d.; October, 2¾d.; October-December, 2 5/32d.; January-March 1933, 2 1/32d.; April-June, 2 1/16d.; July-September, 3 1/32d. per lb.

SAFFRON.—A fair inquiry for small quantities is being received; market steady. Spot, prime B.P., 55s.; extra B.P., 56s.; super B.P., 48s. 3d. per lb., and less for bulk quantities.

SARSAPARILLA.—The demand has been limited, with the market keeping steady. Grey Jamaica, 1s. 10d. to 1s. 11d. per lb.; ; native, mixed colours, 1s. 1d. to 1s. 1½d. per lb.

SEEDS.—ANISE.—Spot, Spanish, 53s.; Turkish, 35s.; Russian, 35s. CANARY.—Spot, Mazagan, 14s.; Tangier, 13s. 6d.; Kenitra, 12s. 6d. LINSEED.—No Mazagan on spot. Morocco sold at 12s. 6d. CORIANDER.—Morocco, 1929 crop, quoted 16s.; wormy, 15s.; new crop for shipment offered at 15s. 3d. c.i.f. CUMIN.—Morocco offered at 32s. spot; shipment, 28s. c.i.f. FENUGREEK.—Morocco, 12s. 6d. spot; shipment sold at 9s. 9d. c.i.f. CARAWAY.—Dutch, spot, business done at 29s. 9d., duty paid. MUSTARD.—English, 21s. to 28s. 6d. per cwt. according to quality. No extra bold.

SENEGA.—This market continues firm and fair interest is shown. Spot, 2s. 2d. to 2s. 3d.; shipment, 2s. 1d. per lb. c.i.f.

SENNA.—The feature of the week has been the active demand for export of Alexandrian manufacturing pods, it being reported that some 200 bales have been taken off the market. Finest hand-picked and medium quality pods are steady and unchanged. Tinnevelly is also very steady, with leaves and pods at former rates on spot, and the shipment market well maintained.

SHELLAC.—The market has lost some of the recent improvement, closing quiet. Standard TN orange, 65s.; fine orange, 80s. to 140s.; pure button, 85s. per cwt. For delivery, TN. October, sold at 57s.; December, 58s.; March, 60s.; for arrival, TN, September-October, 55s. per cwt. c.i.f.

SQUILL.—Supplies of fine new crop are offering at 22s. 6d. to 25s. per cwt. as to quality.

TUBA ROOT.—There is a steady demand for good test root, which is quoted at about 11d. per lb.

VALERIAN ROOT.—The spot market is firm as quoted at 45s. per cwt.

WAX (VARIOUS).—These markets continue very steady and a satisfactory business is being done. CARNAUBA, fatty grey and chalky grey, is quoted at 85s.; medium yellow is unchanged at 130s.; fine yellow, 145s. CANDELILLA is steady at 75s. per cwt. SPERMACETI, steady at 9¼d. per lb. spot. PARAFFIN is about steady from 22s. 6d. to 50s. per cwt. as to melting point. CERESIN is quoted from 35s. to 80s. per cwt., as to colour and melting point. BEES' now very steady, with the market showing more life: bleached, discs, £7 10s.; slabs, £7 5s.; yellow refined, £5 12s. 6d.; yellow crude, 97s. 6d. per cwt. spot.

Essential Oils, etc.

BUSINESS has not been so good this week, but the recent improvement in tone is maintained, and values, particularly for shipment, are very steady. Cananga is dearer. Ceylon citronella closes firm. Bourbon geranium is dearer on spot. New crop lavender prices are now to hand. Sicilian lemon and orange have been of small interest, but in both products the shipment markets tend to become firmer. Patchouli is firmer. Japanese peppermint has lost a point, and is quieter; the American oil is keeping firm for shipment. Wormseed shows a further advance, and is firm.

ALMOND is quoted steadily with genuine s.a.p. at about 7s. 6d., and sweet almond is steadier at 1s. 11d. to 2s. per lb.

ANISE (STAR).—Quoted values on spot and for shipment are about maintained; business remains rather dull: spot, "Red Ship," in leads, 1s. 11d.; in tins, 1s. 9½d.; in drums, 1s. 9d.; shipment, in leads, 1s. 8d.; in tins, 1s. 6¾d.; in drums, 1s. 6¼d. per lb. c.i.f.

BERGAMOT.—Business seems to have been restricted and at keen prices: spot, in the region of 9s. 6d. per lb., with cheap sellers not so prominent.

BOIS DE ROSE.—Cayenne continues firm on spot, and in very short supply at 9s. 6d. per lb. Brazilian is offering at about 4s. 9d. per lb., spot. Cayenne seems to be unobtainable in quantity anywhere.

CAJUPUT is about steady with spot sellers asking about 2s. 4½d. to 2s. 6d. per lb., as to quantity.

CANANGA.—Shipments have been small and supplies on spot are short: spot is dearer at 7s. to 7s. 6d. per lb., as to quantity.

CARAWAY is in fair demand with Continental twice-rectified about 7s. 6d. to 7s. 9d. per lb. for quantities; crude 5d. per lb. less.

CASSIA.—The market is steady but business has been limited. Spot, 3s. 9d. to 3s. 10d.; shipment, in tins, 3s. 2d.; in drums, 3s. per lb. c.i.f.

CEDARWOOD.—The spot market for American is unchanged at 1s. 10d. to 2s., with shipment at 1s. 7½d. per lb. c.i.f. African is quoted on spot at 1s. 7½d. in drums, and 1s. 9d. per lb. in tins.

CINNAMON LEAF.—The market is steady, business fair: spot, 3s. to 3s. 2d. per lb.; shipment, 2s. 7d. to 2s. 8d. per lb. c.i.f.

CITRONELLA.—Ceylon is very steady with a moderate business moving: spot, 1s. 10½d. to 1s. 11½d.; shipment, 1s. 8½d. to 1s. 9½d. per lb., c.i.f. Java is a point easier, and is now steady with spot at 2s. 10d. and shipment at 2s. 7½d. per lb. c.i.f. Ceylon closes firm.

CLOVE.—Offers of Madagascar on spot are rather competitive, and in the region of 3s. 6d. to 3s. 8d. per lb.; shipment at about 2s. 7½d. per lb. c.i.f.

EUCALYPTUS.—Market is quiet, quoted unchanged. Spanish, 70 to 75 per cent., 1s. 2d.; Australian, 70 to 75

per cent., 1s. to 1s. 0½d.; 80 to 85 per cent., 1s. 1d. to 1s. 1½d. per lb., and possibly less for bulk quantities.

GERANIUM.—Bourbon is dearer on spot at about 23s. 6d., and it would cost fully that to come forward. Algerian is unchanged on spot at 24s. per lb. c.i.f.

LAVENDER.—The following prices are for new crop of a good average quality brand: 50 to 52 per cent., 10s. 6d. to 10s. 9d.; 40 to 42 per cent., 9s. 3d. to 9s. 6d.; 38 to 40 per cent., 8s. 9d. to 9s.; 35 to 38 per cent., 8s. 3d. to 8s. 6d.; 30 to 32 per cent., 7s. 6d. to 7s. 9d. per lb., delivered, for quantities. Some brands would be slightly dearer.

LEMON.—Interest on spot has been small. Sicilian hand-pressed is available at from about 4s. to 5s. per lb., as to brand and quality. Reports to hand state the shipment market is firmer and that higher prices for the new crop in December are anticipated. Good brands are now quoted at 5s. and upwards, c.i.f. Californian, spot, in drums, 57 cents per lb.

LEMONGRASS is steady and business has been fair: spot, in good quantities, 2s. 1½d. per lb.; shipment, 1s. 11d. per lb. c.i.f.

LIME.—The market has slackened off and spot lots might be picked up at slightly less than the quoted figure of 34s. 6d. per lb. for West Indian.

MANDARIN is keeping steady, with small lots on spot about 16s. per lb.

ORANGE.—This market has not shown much life, but prices are unchanged, with the shipment market tending firmer. Sicilian, sweet, on spot, 7s.; shipment, 6s. per lb. c.i.f. West Indian, hand-pressed, 5s. per lb. c.i.f. Californian, spot, 80 to 90 cents per lb. as to quantity.

PALMAROSA is steady as quoted at 8s. 6d. to 8s. 9d. per lb. as to quantity. Business is not of much account.

PATCHOULI.—The spot market is firmer and tends to advance.

PEPPERMINT.—Japanese dementholised has not been of so much interest this week, and the shipment price tends to be easier. Spot is in the region of 3s. 7½d. per lb.; shipment, October-December, 3s. 4d.; January-March, 3s. 4d. per lb. c.i.f. American oil continues generally firm for shipment, with the figure about 1 dollar 85 to 90 cents per lb. c.i.f. for natural oil, in drums.

PETITGRAIN.—Business has been limited, but the spot market is steady at about 4s. 3d. to 4s. 4d. per lb. as to quantity.

ROSEMARY.—Spot is holding at about 1s. 9½d. to 1s. 10d., with shipment at 1s. 5d. per lb. c.i.f.

SASSAFRAS.—Dealers are quoting spot at about 4s. to 4s. 3d. per lb. as to quantity; moderate business.

SPEARMINT.—Dealers' prices are maintained at about 7s. 9d. to 8s. per lb., and the market is steady.

SPIKE.—The spot market is steady, with Spanish at 3s. to 3s. 2d.; new crop for shipment is quoted at about 2s. 10d. per lb. French, on spot, 5s. to 5s. 3d. per lb.

WORMSEED.—The spot market continues firm, with holders only willing to sell limited quantities at about 14s. 9d. to 15s. per lb. Shipment offers would work out at about 16s. 6d. per lb., duty paid and landed. Shipment offers are firm and tend to advance.

Fixed Oils, etc.

A GENERAL advance in values of all products in this market is recorded, and in most directions business has been on a much better scale. Except for turpentine and linseed oil, there is a tendency for prices to recover still further. ACID OILS.—The market is better and business is good: coconut and/or palm kernel, 22s. 3d.; groundnut, 20s. 3d.; soya, 15s. 6d., spot. CASTOR.—The market is fully steady and tends to advance: pharmaceutical, 41s. 6d.; first pressings, 36s. 6d.; second pressings, 30s. (barrels); cases £4 per ton extra, ex mills, Hull, in not less than one-ton lots; Bombay, 30s. (drums), c.i.f. COCONUT.—Prices show a good recovery, and there is much more inquiry on the market: deodorised, 34s. (barrels), spot, Ceylon, 24s. 3d. (drums), c.i.f. COTTON. Inquiry has been active this week. The market is firm at the advance recorded: deodorised, 30s. 6d.; common edible, 28s. 6d.; soap-making, 26s. 6d.; crude, 25s. (barrels), spot. GROUNDNUT.—At the higher prices noted the market is steady, and business is good: deodorised, 41s. (barrels), spot; crude Oriental, 36s. (drums), c.i.f. LINSEED (RAW, NAKED).—The market shows an advance on the week, but closes rather unsteady: on spot, 18s. 9d.; September, 17s. 6d.; October-December, 18s.; January-April, 1933, 18s. 10½d. Boiled oil, on spot, 21s. 3d. OLIVE.—There is a little more inquiry and the market is steadier; edible, in tins in cases, 8s.; edible, in drums, 7s. 6d.; B.P., 4s. 9d. per gallon, in 40-gallon barrels. PALM.—The market is much steadier and prices have improved, and tend to advance further: Lagos, 19s. 3d.; softs, 17s. 6d.; mediums, 18s. 6d.; hards, 19s. 6d.; bleached, 20s. 9d., spot. PALM KERNEL is steadier at better prices, and business is improving: deodorised, 33s. 3d.; crude, 24s. 9d., spot. RAPE.—The market shows a recovery in values, and is more active: refined, 33s.; crude, 31s., spot. RESIN.—At the advances recorded the market is steady: B, 13s. 3d.; D, 13s. 9d.: F/G, 14s. 6d.; N, 20s.; W/G, 22s.; W/W, 24s. per cwt., ex wharf. SOYA.—Business has broadened and the market is steadier at better prices: deodorised, 31s. 3d.; crude, 26s. 9d., spot. TURPENTINE.—The market closes a point below the best, and is rather dull. Total London stocks, 21,079 barrels. On spot, 63s. WOOD.—Hankow, in barrels, on spot, has advanced to 52s. 6d., and the market is firm.

U.S. Imports of Essential Oils

THE imports of essential oils into the United States during the first six months of this year were as follows. Compared with the imports for the same period of 1931 the quantity was greater but the total value substantially less.

	1931		1932	
	Pounds	Value	Pounds	Value
Cassia and cinnamon ...	140,631	$121,268	159,699	$ 85,747
Geranium ...	80,561	230,362	85,754	266,766
Otto of roses (ounces) ...	3,022	36,709	7,973	61,874
Bergamot ...	43,368	80,878	25,692	43,302
Citronella and lemongrass ...	417,410	160,433	565,718	185,216
Lavender and spike lavender	159,982	353,567	102,703	129,308
Lemon ...	239,861	140,397	104,275	81,819
Orange ...	72,633	140,466	72,244	74,198
Sandalwood ...	5,992	27,886	3,805	16,004
All others ...	1,285,545	645,577	1,668,136	546,124
Total ...	2,450,005	1,937,543	2,795,999	1,495,358

Trade-Mark Applications

The figures in parentheses refer to the classes in which the marks are grouped. A list of classes and particulars as to registration are given in "The Chemist and Druggist Diary," 1932, p. 339.

(From "The Trade Marks Journal," August 31, 1932.)

"CAMELIA"; for chemicals (2). By St. Andrew Mills, Ltd., 34 St. Andrew Road, Walthamstow, E.17. 532,082.

"VERMA GROL"; for chemicals (2). By Société des Vermènes (Société Anonyme), 46 Rue du Bac, Asnières, France. 533,072. (Associated.)

"RAINBOW"; for veterinary cod-liver oil (2). By Cooper McDougall & Robertson, Ltd., Ravens Lane, Berkhamsted. 533,707.

"VIKING"; for chemicals (2). By Norsk Hydro-Elektrisk Kvaelstofaktieselskab, Solligaten 7, Oslo, Norway. 533,182.

"GLANOID"; for veterinary chemicals (2). By Armour & Co., Ltd., St. Martin's-le-Grand, London, E.C.1. 533,732. (Associated.)

"GROBESTKER"; for fertilisers (2). By The Aberdeen Combworks Co., Ltd., 40 Hutcheon Street, Aberdeen. 533,933.

"VANLEN"; for a germicide and insecticide (2). By H. Van Allen, 14 Montgomery Street, Belfast. 534,099.

"VENO'S LIGHTNING COUGH CURE" ("Lightning" disclaimed); for cough medicines (3). By Veno Drug Co., Ltd., Chester Road, Manchester. 532,905. (Associated.)

"MERRIE AND BRIGHT" in Old English characters; for laxative tablets (3). By R. Lazarus, 257 Mare Street, Hackney, E.8. 533,557.

"DELBAY"; for medicated salts (3) and for toilet salts (48). By Metabolic Manufacturing Laboratories, Ltd., 26 Gt. Ormond Street, London, W.C.1. 533,671/673. (Associated.)

Correspondence

Letters should be written on one side of the paper only. Correspondents may adopt an assumed name, but must in all cases furnish their real name and address to the Editor.

Appearance and Reality

SIR,—It is a somewhat slack afternoon, and customers are not coming in too quickly; I have in front of me, on my desk, the *C. & D.* of a fortnight ago; I have been turning over the pages and I return again and again to the very fine photographs of Scotland, which are so appropriate, in view of the British Pharmaceutical Conference which is being held this week at Aberdeen. I should like to be there to join in the social reunions and, more particularly, to get a first-hand impression of the granite city, for which I have always felt almost an affection. Unfortunately I cannot afford it; I cannot afford a holiday at all this year. In my case, as in that of many thousands more in this country to-day, the income-tax collector has taken all my spare cash, if not much that is not spare. I must stay at home and, in the intervals of serving customers, I will try to visualise the meetings and get some idea of the business that is being transacted there. First of all there is the audience. I see in imagination the heads of successful manufacturing concerns, the pharmacists who own "Ethical" businesses, the officials of trade organisations, wholesale and retail, the sprinkling of common or garden pharmacists who are always to be found at the meetings of the Conference, if one may judge from the published list of visitors. I do not see the ladies; to them is allotted the better part. And then there are the authors of papers—an imposing array. B.Sc.s, F.I.C.s, Ph.D.s, Ph.C.s, M.D.s. and many more; good fellows all, I am sure. One thinks of them with strong faces usually seen in profile, a test-tube in their hands, through the contents of which they are gazing intently. Their home is, in nine cases out of ten, the (figuratively) rarefied air of the laboratory; the majority of them would be total strangers behind my counter. I look at them and their accomplishments with something akin to reverence; I feel grateful to them for the work they have put into their papers. I wonder what I, as a country pharmacist, have in common with a gentleman who can discourse on the "Antidiuretic and Oxytocic Potencies of Commercial Pituitary Extracts." I feel that I should be able to discuss "The Origins of British Pharmacy," although in my present frame of mind I feel that "The Vestiges of British Pharmacy" would be a more appropriate subject. Then again, what has "The Preparation of Certain Aliphatic Amino-Alcohols" to do with me? For the life of me I cannot link it up with what is actually happening in my shop to-day. And so I see in imagination the light streaming through the stained glass windows, and hear the cultured voice of the gentleman who reads the paper, the remarks of the chairman, of the few speakers who have anything to say on the amino-alcohols, and I say to myself, "What in the name of Galen has all this to do with pharmacy as it is understood and practised by 90 per cent. of pharmacists to-day?" What is the reality? As I have been writing this letter, I have been taking a note of the sales I have made; and for the sake of the gentleman who has been discoursing on the anti-diuretic and oxytocic potencies of pituitary, I will give a list of them. Tube of seccotine, a 1s. card of hair curlers, a penny fly catcher, "chewing gum please," a "hanky" puff, bath crystals, lemonade powder, mend-a-tear, and—no pharmacy, you say? Yes; I "dispensed" a real script. Here it is. A slip of paper, with the initials of a medical man. There were three items on it: (1) A bottle of ——'s thyroid tablets; (2) a tin of —— for constipation; (3) a bottle of ——, a combination of malt extract and hæmoglobin. As all three were written in English I simply handed them over, and was glad to get the usual price without comments that somebody down the street had charged her less the last time she bought them. Now, Sir, I am going to suggest that the Conference is perpetuating an ideal which is as far removed from what pharmacy is to-day, in nine pharmacies out of ten, as a Mozart symphony is from ragtime. The subjects discussed at the Conference do not and cannot, under present conditions, interest the average pharmacist. He is engaged in a stern battle for his living, and to get it he has to sell side-lines innumerable: proprietaries and toilet accessories by the hundred; he is often a huckster pure and simple. I would make the Conference more practical, more in touch with modern conditions. Is it not possible, whilst retaining some of the scientific subjects, to dilute them with a few papers dealing with problems that will appeal more to the rank and file? Here are a few suggestions:—"Profits and how to make them." "How should scripts be priced?" "Pharmaceutical ethics." "The apprentice and his training." No more at present. Insurance "scripts" are coming in, and stock mixtures are in demand. Pharmacy is once more coming into her own.—Yours, etc.,

COUNTRY CHEMIST (14/9).

The New Pharmacopœia

SIR,—Although the 1932 British Pharmacopœia does not become official until October 1, I believe there was a general agreement between the wholesale drug houses that from September 1 supplies of the new preparations would be available. This is a wise provision, as many pharmacists were able to obtain supplies so as to have them ready by the due date if required. It may be suggested that small orders should be placed in the first instance, as some little time must necessarily elapse before the use of many of the new preparations becomes general. List prices for the majority of the new lines have been arranged. An examination of these gives the impression that no great changes have been made in the prices of those preparations which have been altered in composition or strength. There is, however, one notable exception, concentrated compound infusion of gentian. "Infus. gentian. co." ordered in a prescription after October 1 will have to be either the official fresh infusion or one made from the official concentrated infusion. Hitherto each wholesale house has made its own concentrated infusion and there has been no standard, although the N.H.I. tariff has shown a price for it. The price that will be shown in the N.H.I. tariff will be that of the standard preparation, and will be about 2s. 6d. per lb. Vinum ipecacuanhæ has been left out of the new B.P. and tinct. ipecac. substituted. It will, however, be quite in order to sell ipecacuanha wine as hitherto, provided the label either bears no allusion to the B.P., or states that it is B.P. 1914. A small quantity of tinct. ipecac. may be ordered at first. A word of caution should be given regarding the new ext. ergotæ liq. This will not keep too well, and should be ordered in small quantities. A warning about extract of malt and extract of malt with cod-liver oil is necessary. Both these will now be official. Hitherto there have been on the market preparations which would not conform to the new standards. This has been particularly the case with the latter product, many samples of which have contained less than 15 per cent. of cod-liver oil by volume. It will now be an offence to sell either preparation unless it is B.P. Pharmacists who are not sure of the products they are selling should communicate with the manufacturer or wholesaler. In many cases stocks are already in hand and labels may have to be scrapped or altered. There is certain to be some confusion at first during the change over, but the information already given in the pharmaceutical Press should prove invaluable in helping pharmacists through.

I am, etc.,

MANUFACTURER (13/9).

The Proposed N.H.I. Terms

SIR,—Panel chemists are now enabled to get some idea of the preliminary negotiations between the National Pharmaceutical Union and the Ministry of Health over the new Insurance contracts (*C. & D.*, September 3, p. 250); and it would seem that if the suggestions of the Ministry are carried out the remuneration for this work will be slightly worse rather than better. The first declaration, which the N.P.U. so far states that it cannot accept, is that Clause 4 (4) shall go. The chemists' objections to this step were fully set out when the removal of this clause was first suggested. The Ministry may not be concerned with the ethical standards of any profession; but it is admittedly responsible for an adequate panel service, and it is practically certain that in a short time the removal of this clause would produce results which would ultimately prove not to be beneficial to efficiency. A feature has been made of the surplus payments to chemists in the last one or two years. But when we take this payment spread over the period of the last contract for five years, and reckon the number of chemists' shops as about 10,000, it amounts only to £6 per shop a year, or 2s. 3d. a week, hardly an extravagant sum when we consider the service provided and the tariff rate of payment for it, or when we think of the far larger sums of public money which are spent freely in less important ways. Chemists can only reckon themselves fortunate in having recouped some of their losses of the past, which date back further than the five years under discussion. The only satisfactory way to settle the question would be to pay the chemists on the panel a proper dispensing fee, not the present miserable sum.

Faithfully yours,

AS EXPECTED (12/9).

Ways of Increasing Sales

SIR,—Mr. Herbert E. Kendrick, in his notes on "Ways of Increasing Sales" (*C. & D.*, September 3, p. 249), says that the slogan for chemists to keep in mind is "Show more—sell more." This slogan has been worked to its fullest extent by the originators of the bazaars. Although I recognise the value of display as a selling agent, it would be impossible for a pharmacy to adopt such a system completely. For one thing, the premises are not large enough; the average pharmacy has room for the accustomed fixtures and that is all. If a chemist was able to extend his premises sufficiently to adopt the open display style of counters, he would soon arrive at a point where, like the multiple shops, the pharmacy would be lost in the bazaar. From a money-making point of view this might possibly be an improvement, but the shop would no longer be a pharmacy. Many chemists attempt to utilise every corner for display by filling it up with carded goods, dummy packages, and showcards; in a very short time the place becomes a mere lumber room, and whatever selling effect might have been produced is obscured by the untidiness and dust. It is better, to my idea, to make good block displays of a few lines at a time and to change them fairly frequently; in a medley of many articles there is nothing outstanding to catch the customer's eye, whereas a good bold display is bound to do so, and frequent change is necessary because of the many different lines we are bound to carry in stock. There is always, of course, the customer who expects to find his usual bottle of cough mixture in the same spot on a display stand year in and year out, but it is new custom one is seeking to attract; it should not be difficult to retain the old. I was interested in Mr. Kendrick's account of the chemist who talked to his customers and left the actual handing over of the goods to his assistants, because I know one man who has a few words of chaff or a joke for every customer who comes in. Most of them know him and like his badinage—probably many of them deal with him for that reason; but if I did such a thing behind my own counter I might never see the customer again. One has to learn the right line to adopt.

Yours truly,

DISPLAIT (13/9).

Miscellaneous Inquiries

When samples are sent particulars should be supplied to us as to their origin, what they are, what they are used for, and how. We do not undertake to analyse and report upon proprietary articles nor to publish supposed formulas for them.

R. L. P. (10/48).—SOLUTIONS FOR CARBOYS.—The coloured solutions you require are made as follows:—

Blue	
Sulphate of copper	4 oz. or more
Solution of ammonia	a sufficiency
Distilled water	2 galls.

Dissolve the sulphate of copper in 2 pints of water, and add solution of ammonia with constant stirring until the precipitate is re-dissolved, then add the rest of the water.

Orange	
Bichromate of potassium	1 lb.
Nitric acid	8 oz.
Water (distilled)	2 gals

Dissolve the bichromate in the water, and add the acid.

T. B. (23/78).—VITAMINS IN POULTRY FOOD.—Assuming that the purpose of adding the cod-liver oil is to ensure a sufficiency in the poultry food of the food accessory factors or vitamins, you can avoid the addition to the food of the oil itself by using instead one of the concentrates of vitamins A and D now on the market. Or you might be able to arrange for a special concentrate to be prepared for your particular purpose, but it will be necessary for you to obtain a licence from the Glaxo Laboratories, authorising you to use vitamin D in the way suggested. This, however, can be obtained on quite moderate terms. If, in addition, you rely upon the special food value of the oil you might use the hydrogenated cod-liver oil in powder form; but this could not be guaranteed to be rich in the necessary vitamins.

L. A. E. (17/8).—The following is the formula for the late Dr. R. W. MacKenna's ointment for psoriasis:—

Ung. acid. salicyl.
Ung. picis. liq.
Ung. glyc. plumbi subacet.
Ung. hyd. nit. dil. .. .. aa. p. æq.

Yellow or white paraffin may be used in the component ointments.

G. C. M. (14/3).—SPECIFIC FOR BACILLARY WHITE DIARRHŒA IN FOWLS.—This is an aqueous solution of sodium carbonate containing a little organic matter, a small portion of which is thymol, both by odour and by test.

Retrospect of Fifty Years Ago

Reprinted from
"The Chemist and Druggist," September 15, 1882

British Pharmaceutical Conference

The opportunity for pleasant reunion and discussion once a year among men of similar pursuits and interests, afforded by the British Pharmaceutical Conference, has not been accepted to much more than an infinitesimal extent by the chemists and druggists of this country. From the 118 names inscribed on the register at Southampton, deduct those of residents, and those of gentlemen interested in pharmacy and therefore among those for whom the Conference was founded, yet not actual shop-owners, and some fifty or sixty may remain. This number can hardly be what was expected by those who prepared the scheme of the Conference. . . . We have written elsewhere the president's address, which it must be said, gave the 1882 meeting its character. The papers read were many of them useful, but none of them was of startling interest. Several were professedly fragmentary, and a few gave internal evidence of having been got up for the occasion.

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Pagenstecher's Eye Lotion
Papain (*Dega Brand*)
Pebeco (*Beiersdorf*)
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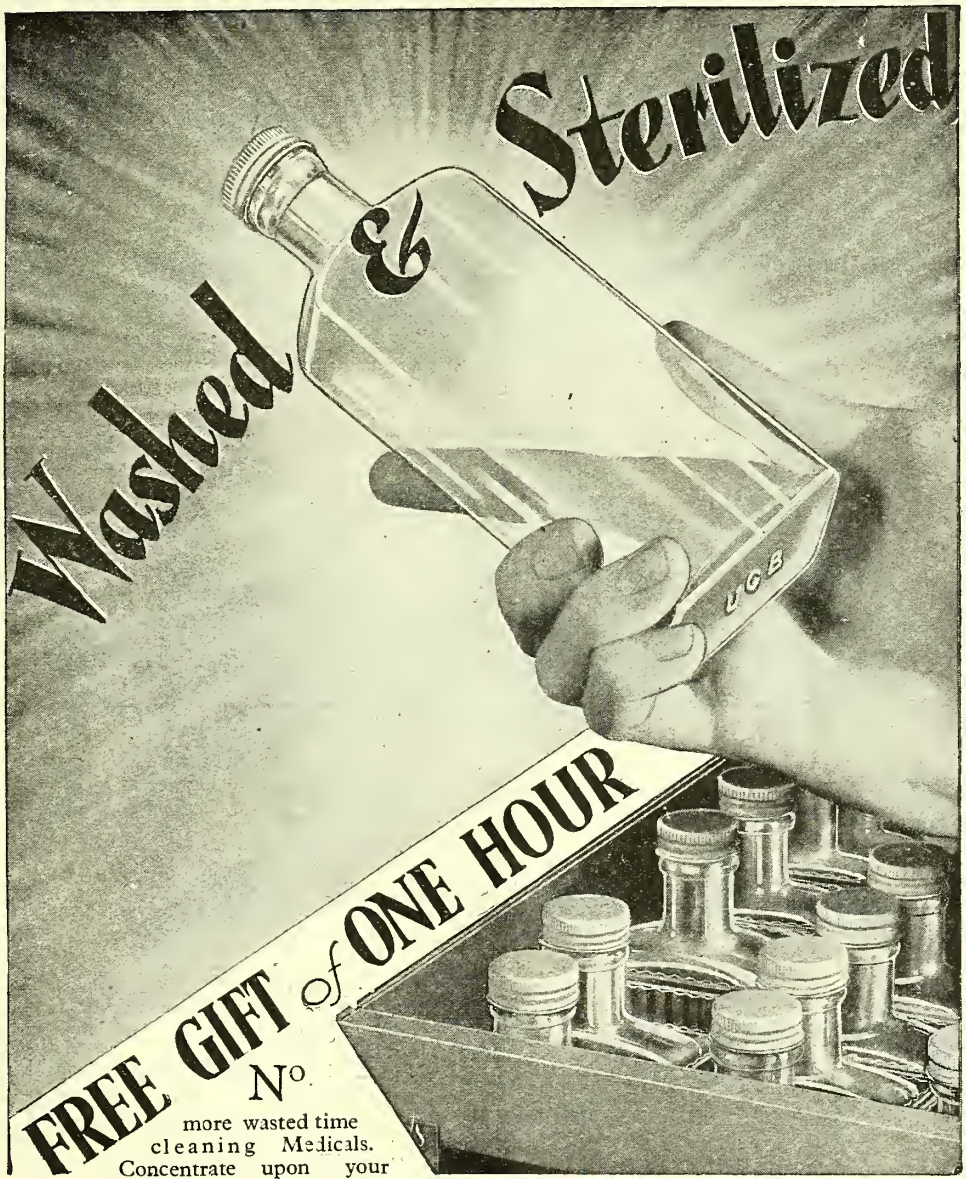

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THE CHEMIST AND DRUGGIST SUPPLEMENT

28 ESSEX ST. LONDON, W.C.2

SEPTEMBER 17, 1932

This Supplement is inserted in every copy of The Chemist & Druggist.

THE CHEMIST AND DRUGGIST SUPPLEMENT

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BUSINESSES WANTED and for DISPOSAL, PREMISES TO LET, PREMISES WANTED, PARTNERSHIPS, GOODS for SALE and AGENCIES—6/- for **50** words; every additional **10** words or less, **6d.** (Box No., **1/-** extra.)

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BEDS.—Medium-class Chemist's Business; accountant's figures showing £1,300 returns, £314 net profits; in normal times £1,500 and £400; small lock-up shop in growing district; easily worked; expenses very low; £800. 275/6, Office of this Paper.

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CLEETHORPES.—Chemist, best position in residential shopping parade; all the year round trade; now doing £25 and increasing; plenty of scope for younger man; house sub-let, leaving shop at 31s. clear weekly; lease, goodwill and fixtures £200; stock at valuation, about £350. Marsden, Valuer, 29 Oakwell Crescent, Leeds. 'Phone: 62890 Roundhay.

EAST LANCS.—Old-established Retail Chemist Business; turnover £1,700 (1932); main street; nicely fitted; good Dispensing, Toilet and Photographic trade; double-fronted; £400, plus stock at valuation, about £350; good reasons for disposal; suit beginner. Particulars on application. 275/19, Office of this Paper.

ILFORD.—Modern-fitted, double-fronted, corner Shop; new shopping centre; long lease; turnover £1,500-£1,600, with every prospect of increasing. As immediate sale is wanted to close estate, will accept valuation of fixtures, fittings and stock, or an offer for the whole concern. Further particulars, Percy E. Slack, Incorporated Accountant, 44 Bedford Row, W.C.1.

KENT COAST.—Turnover £1,030; lock-up shop; rent £35; growing neighbourhood; business increasing; net profit £280; good stock and fixtures; price £650. 275/11, Office of this Paper.

LANCS.—For immediate disposal old-established Retail Dispensing Business; well fitted; good stock carried; lease 4 years; rental £26 per annum; returns average £18 per week; great scope for increase; reasonable offer considered. Fullest particulars, Parkin S. Booth, 2 Bixteth Street, Liverpool.

LEEDS.—Chemist; Rexall and Kodak Agencies; busy thoroughfare, near centre of city; industrial; returns £1,000; N.H.I. Dispensing fees £2 weekly; rent and rates £72 per annum; three stock rooms and cellar; no old stock; all clean, saleable goods; goodwill, plus stock and fixtures at valuation, about £500. Marsden, Valuer, 29 Oakwell Crescent, Leeds. 'Phone: 62890 Roundhay.

LONDON, S.W.—A sound Retail Pharmacy for disposal; established 7 years; good living accommodation; exceptional opportunity for Optics; 20 years' lease; low rent and rates; takings £25/7 per week; good stock and fittings; price £750, all at. Write 275/4, Office of this Paper.

LONDON (Notting Hill District).—Small Chemist's Business or Drug Store; nice shop, lock-up; low rent; fresh stock; lots of scope for development; fine opportunity; price for immediate sale £150 all at. 276/23, Office of this Paper.

LONDON, E.C. (Very busy main street).—Old-established owner retiring; net profit £400 per annum, accountant's figures; great scope for increase; easy hours; price, including the valuable lease, fittings, etc., and large stock, only £675; exceptional opportunity. Apply Preston & Partners, Valuers, 29 Ludgate Hill, E.C.

LONDON, W.—Good-class Business in busy shopping centre; respectable living accommodation; low rent on old lease; recently opened, but doing good turnover; immense scope for increase under proprietor with initiative; reasonable price asked for quick sale. Full investigation invited. 277/190, Office of this Paper.

MIDLANDS.—Good-class Business on main road of thickly populated, charming suburb; living accommodation; more private dispensing than N.H.I.; returns present time £25-£30 per week; ample scope for energetic man with personality; shop large, well fitted, fully stocked; established 10 years. Full details to genuine inquirers. 275/9, Office of this Paper.

NORFOLK COAST.—A good, profitable Business is for Sale (or would exchange for small Country one); double-fronted lock-up shop, well fitted; rent and rates about 16s. weekly; turnover last year £1,200; scope for increase in Optics and Dentistry; Kodak Agency. Apply 277/3, Office of this Paper.

NOTTINGHAMSHIRE.—An excellent opportunity occurs in main street of a busy town to rent or lease a Shop (for the last 20 years occupied by a Chemist); no charge for goodwill; taking over of stock is optional; rooms over may be let off. G. Cox & Son, Auctioneers, West Gate Mansfield.

ADVERTISER with small Business in suburb of Yorkshire town, doing over £1,200 at good profits, would exchange for larger Business in pleasant country or seaside district; would suit elderly pharmacist wishing easier time; balance by arrangement. 274/21, Office of this Paper.

BARGAIN.—Sound Business near London; well fitted and stocked; takings £25 per week, increasing; good living accommodation; moderate price for quick sale owing to illness; good lease at moderate rental. 278/800, Office of this Paper.

CHEMIST'S, opposite tube station, W.; excellently fitted double-fronted lock-up shop; railway tenancy at £60 per annum inclusive; trade £14 per week; steadily increasing; price only £125; s.a.v., about £300. Woodcocks, 20 Conduit Street, W.1.

FOR Sale, the oldest Chemist's Shop in Yorksbire; Wine Licence; excellent Proprietary; been established nearly a century; returns £5,000 per annum, under management. Also Drug, Toilet and Fancy Business in market; turnover £3,000 per annum. Particulars at interview only to those with requisite capital. 272/16, Office of this Paper.

FOR Sale as going concern, good Dispensing and General Business, main road, Kent, 10 miles London; fast-growing district; good living accommodation; low rent; long lease; splendid opportunity for owner-manager. Apply 275/14, Office of this Paper.

HERBALIST, Druggist, etc., Retail, shop in busy main thoroughfare, N.W. district, London; good domestic accommodation; lease 12 years; old-established business; open to fullest investigation; price £2,000, including stock, fixtures, etc. Apply by letter in first instance to Pawley & Malyon, Incorporated Accountants, Finsbury Court, Finsbury Pavement, E.C.2.

IN LIQUIDATION.—J. Dalby & Co. (Blossom), Ltd., Blossom Soap Works, Undercliffe, Bradford, Lanoline Manufacturers and Soap Blenders. For Sale as a going concern. The business offered as a whole, or each department separately. For a quick sale a very low price would be accepted, otherwise assets must be sold piecemeal. The assets consist of Lanoline Manufacturing Plant, Soap Blending Plant, excellent Office Equipment, Motor Van, Motor Cycle and Sidecar. This is a rare opportunity, as thousands of pounds have been spent in experiments and adapting of premises, and now lanoline of excellent quality has been produced, the formula for which is included. The purchaser would reap the benefit of this expenditure. Best raw material available locally. Apply Messrs. Rhodes, Stringer & Co., Incorporated Accountants, 31 Manor Row, Bradford.

OWNER WISHING TO RETIRE.—Old-established Business in Yorkshire; Family, Agricultural and Photographic; large turnover at good profits; every help given to buyer. Particulars to buyers. No triflers, please. 275/8, Office of this Paper.

SNIP.—For immediate Sale, first-class Pharmacy, London, S.W.; suitable M.P.S.; rent shop only, on lease, £100 per annum exclusive; rates £20; N.H.I. average 500 per month; cash takings £1,150; stock £300; valuation fixtures £200, or arrangement; Optical and Sun-Ray equipment; ought to be double in smart masterman's hands. 277/22, Office of this Paper.

£200.—Closing down Saturday. Opportunity for live man with small capital. Neglected Business at Bournemouth, amidst hotels and boarding-houses; stock and fittings valued £450; rent £95 inclusive, but will accept £200 to save trouble of removing. Apply not later than Saturday, 17th, at 23 St. Michael's Road, Bournemouth; after that date, "Chemist," 83 Barnsbury Road, London, N.1. 'Phone: North 1224.

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6s. for 50 words or less; 6d. for every additional 10 words or less, prepaid. (Box No., 1s. extra.)

COMPANY FORMATION.—About six sound Businesses required immediately in or near London (30-mile radius), showing returns of £30-£100 weekly, with proportionate overhead charges. Preliminary negotiations can be entered into immediately on reasonable terms. Prospective vendors are invited to write privately, with the assurance that no information will be disclosed without express permission. Ernest J. George, Sentinel House, Southampton Row, W.C.1. Telephone: Museum 8340.

PHARMACIST wishes to hear of genuine Cash Chemist's Business for disposal within 60-miles' radius of Manchester, with good living accommodation; healthy district; returns £1,500; plenty of Private and N.H.I. Dispensing; good position; might entertain active Partnership with vendor wishing to retire with view to early succession for suitable business. Give fullest particulars, in strictest confidence. 275/20, Office of this Paper.

WANTED to purchase small Drug Store, either in North or North-East district or East End suburb preferred, but not essential. Apply, giving full particulars, to Thomas, 14 Hampstead Road, N.W.

WELL-KNOWN firm wishes to take over for cash a high-class Dispensing Business in London or near Home Counties; turnover not less than £4,000. Replies treated in strict confidence, and references exchanged. "Rhei," 209/502, Office of this Paper.

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DRUGS AND SURGICAL DRESSINGS.

THE House Committee invites Tenders for Surgical and Antiseptic Dressings, also for Drugs, for immediate and future delivery.

A list of these, with further particulars and form of tender, may be obtained on application to the Superintendent's Office.

Tenders, duly sealed, are to be returned to the Superintendent's Office not later than September 23, 1932.

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UNIVERSITY COLLEGE, NOTTINGHAM.
SCHOOL OF PHARMACY.

THERE is a vacancy in the School of Pharmacy for a Demonstrator at a payment of £150 per annum for at least two sessions. Applicants must hold the Ph.C. Diploma and London Matriculation, and be prepared to read for a degree, or must hold the B.Pharm. Degree and be prepared to read for the B.Sc. Special Degree, or to undertake work leading to a higher degree.

Applications must reach the Registrar not later than 21st September, 1932.

AGENCIES.

SCOTLAND.—Manufacturers' Agent, with long-established connection, Wholesale and Retail Chemists and Hospitals, wants additional high-class Agency; ground covered by car; office and showroom in central position in Glasgow. 278/2, Office of this Paper.

TO Overseas Manufacturers of Proprietary Preparations for the Medical, Dental and Veterinary Professions. Correspondence invited from Manufacturers desiring to depute the Manufacture, Packing, Sales Distribution, Advertising and Storage to a British company of 30 years' highest reputation, possessing established sales organisation throughout Great Britain, Ireland and India. Inquiries strictly confidential 209/497, Office of this Paper.

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SHOPS to Let, reduced rentals, fronts fitted, in new parade in midst of dense working-class area; large floor area; special rental £100 per annum; opening for most trades. Well Hall Parade, Well Hall Road, Eltham, S.E.9, or Laings, 296 High Holborn, W.C.1. 'Phone: Holb. 6086.

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HAMPDEN CLUB, Hampden Street, N.W.1, close to King's Cross Station. Large club rooms. 300 bedrooms and bed-sitting rooms, 15s. to 25s. per week. Illustrated Prospectus, Secretary. Museum 3424.

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APPRENTICES.

YOUNG lady, 19, desires Apprenticeship in S.W. area; passed Part I; deferred Botany. Reply 209/509, Office of this Paper.

SITUATIONS OPEN.

RETAIL (HOME).

6s. for 40 words or less; 6d. for every additional 10 words or less, prepaid. (Box No., 1s. extra.)

BIRMINGHAM.—Qualified Manager required for business in industrial district. State age, experience and salary required. All applications answered if stamped envelope enclosed. Richards, Chemist, 47 Three Shires' Oak Road, Bearwood, Birmingham.

BIRMINGHAM.—Qualified Assistant required for working-class Business; permanent situation; light duties only and exceptionally short hours (salary low accordingly). Please give usual particulars, stating wages required, to "Chemist," c/o 29 Bellbarn Road, Edgbaston, Birmingham.

LONDON, S.E.—Qualified Assistant wanted; all-round experience; 25-30; able to take charge; good Salesman, Window-dresser, understand Photography (no D. & P.), quick Dispenser; cash trade; good references essential. Particulars, salary, copies of testimonials and snap in first letter; two kept. 274/27, Office of this Paper.

LONDON, S.E.1.—Junior Assistant (male) for working-class business and large N.H.I. Send full particulars, stating when free, to P.C.B. 48/4, Office of this Paper.

LONDON, E.10.—Qualified Lady Chemist required; permanency; must be good Window-dresser, Counter, etc. Apply, stating age, experience, references and salary required, to 276/21, Office of this Paper.

LONDON, E.—Young Man, unregistered; essentials: Salesmanship, paying Window-dresser, with initiative to increase business; practically Working Partnership; no Dispensing or Poisons. Do not apply unless looking for a permanency, stating fully age, salary and experience for past six years. 276/29, Office of this Paper.

LONDON, N.—Junior Unqualified Assistant required, well trained in Dispensing and Counter work; splendid opportunity for smart youth not long out of apprenticeship. Apply, giving full particulars of age, height, experience, and salary required (outdoors), to 277/14, Office of this Paper.

MANCHESTER.—Locum wanted to take charge for two days only, Saturday, October 1, and Monday, October 10. Apply, with full particulars, to Miles Platting Pharmacy, 30 Oldham Road, Manchester.

SHEFFIELD.—Vacancy for Junior or Improver, with knowledge of Dispensing and Window-dressing. Apply, stating age, salary, experience, and referencee, 209/505, Office of this Paper.

APPLICATIONS are invited for the post of Assistant Dispenser (female) in a London Hospital. Intending candidates, who must hold the Pharmaceutical Society's qualification, should submit applications, stating age, experience and salary required. Write Box 527, 8 Serle Street, W.C.2.

ASSISTANT wanted (near London); knowledge of Optics an asset, but not essential, not necessarily qualified, but smart Salesman and Window-dresser; moderate salary and commission; can live in if desired. State age and salary required. 274/80, Office of this Paper.

CHEMIST-OPTICIAN Manager required for S.E. London; working-class; salary and commission offered to right man; preference to one willing to make small investment; nsual particulars of experience and salary required. 277/19, Office of this Paper.

GENTLEMANLY Assistant, unqualified, about 21, required, end of September, in the general business of a country market town pharmacy; Veterinary, Photographic and Window-dressing experience desirable; easy hours. Full particulars in first letter. J. C. Holton, Fakenham, Norfolk.

JUNIOR Assietant (male) for good-class Country Business; short hours; no N.H.I. Apply H. Meynell, Tenterden, Kent, stating age, height, salary required and particulars of experience.

KEEN, conscientious, unqualified Junior required as Retail Canvasser; London suburb; salary and good prospects if not afraid of work. 274/24, Office of this Paper.

MANAGER, unqualified, over 30; good Prescriber and profit-maker essential; poor locality, East End of London; £50 good faith deposit required, returnable with interest; out of takings pay all accounts and stipulated amount to the proprietor; keep the rest; worth £3 to £5 per week or more; agreement to sign. 277/15, Office of this Paper.

OCTOBER 3.—Unqualified male Assistant wanted for a good-class busy Dispensing and Family business. Apply, with fullest particulars, references, and photo, to A. F. Corfe, Corfe & Son, Chemists, Maidstone.

PART-TIME, about 3 hours daily, to canvass locally. "Chemist," 162 Thornbury Road, Isleworth.

QUALIFIED Manager for branch near Slough; must be capable at D. & P., good Window-dresser; interest given in business. H. Pickett, Chemist, Farnham Common, Bucks.

QUALIFIED Lady Assistant required immediately; must be experienced Dispenser, with good Counter experience. Full particulars of experience, age, salary required. Applications not answered in five days declined with thanks. Holden, 83 High Street, Walton-on-Naze, Essex.

QUALIFIED lady Locum from October 1 to 15 inclusive; live out; tea provided daily; all N.H.I. paid; return rail paid. Terms to Rowcroft & Co., Ltd., 66 Week Street, Maidstone.

QUALIFIED Assistant, not under 27 years of age, with West-End experience, for a high-class Dispensing business; no photographics, N.H.I. or optics; hours 8.30 to 7. Apply with full particulars of salary, height, etc., but no photo. 278/3, Office of this Paper.

REQUIRED, Chemist, Optician, fully qualified, as Branch Manager for new Branch; must be experienced; state age, etc.; progressive salary and pensionable. Apply, by letter in first instance, to Pharmacy Manager, 24 Martin Street, Stratford, E.15.

REQUIRED, for about the first two weeks in October, gentlemanly unqualified Assistant as Locnm; moderate salary; duties light. Apply, giving full particulars, to The Drug Stores, Broad Street, Leominster, Herefordshire.

PHOTOGRAPHS, TESTIMONIALS, &c.

When answering advertisements in this section applicants are strongly advised not to send (unless specially requested) ORIGINAL TESTIMONIALS or VALUABLE PHOTOGRAPHS. As can be readily understood, when an advertiser receives from 60 to 100 replies the task of returning photographs, testimonials, &c., is one of some difficulty.

REQUIRED, in six weeks, a keen young Chemist to manage newly-established Branch in large Devon town; West Country experience preferred. State age, height, salary required, and enclose photo (returnable), to 276/31, Office of this Paper.

REQUIRED, for residential district, one hour from London, really capable Registered Manager; for one with a moderate amount of capital there is an excellent opportunity for succession, but this is not essential. Unregistered Assistant also required; must be good Window-dresser. 276/39, Office of this Paper.

TAYLORS BRITISH CHEMISTS have a vacancy for an experienced Manager in London. Applicants should give full details (by letter only) of experience, age, height, wage expected. Applications not answered in four days respectfully declined. 55 Pall Mall, London, S.W.1.

WANTED for country business in nice district by end of September, a qualified Chemist; must be capable and hold good referencee. When applying state age and salary required (outdoor). 273/38, Office of this Paper.

WANTED, keen, energetic, qualified Manager for neglected business in Coventry; applicants should have knowledge of buying. State salary required and enclose photograph. 275/15, Office of this Paper.

WANTED, for early October, Unqualified Male Assistant. Usual particulars to Bodley, Four Oaks, Sutton Coldfield.

WHOLESALE.

A SIDE-LINE at competitive prices open to smart Traveller with good connection of Chemists in S.W. and S.E districts, by well-known firm. Write: "Olivaco," 173 Goldhawk Road, W.12.

FIRST-CLASS Representatives wanted to carry exceptional lines in French Perfumery, Face Powders, etc., to be nationally advertised; must have well-established connections; liberal commission basis to commence. Reply, stating ground covered, to The Jenvan Manufacturing Co., Cardiff.

J. E. ELLIS, LTD., Horsforth, Leeds, have several vacancies for Salesmen in Midlands, Wales, London, South Coast, selling Daisy, Dyanese Dyes; salary, liberal commissions, but would consider in certain areas commission men carrying non-competitive lines. Apply, letter only, Sales Manager.

LONDON Manufacturing Chemists require part-time Representative(s) to cover Norfolk, Suffolk, Cambridge, Huntingdon, Northants, and major portion of Essex and Hertford; Drugs, Galenicals, Packed Goods, etc.; fair existing connection with real possibilities; retaining fee and liberal commission. Apply 209/504, Office of ths Paper.

REPRESENTATIVE, with strong connection in Yorkshire and East Lancashire amongst Chemists and Stores, wanted for well-known Health Salt, Packed and Loose Tablets; must be active, live salesman; own car preferred; salary, expenses and commission. Harrogate Tablet Co., Chatsworth Grove, Harrogate.

REPRESENTATIVE required by important Cosmetic Manufacturers for Manchester, also Birmingham; must have strongly established connection in area; state age, average annual turnover, salary required; excellent prospects for a live man having necessary qualifications. 209/506, Office of this Paper.

REPRESENTATIVE required for Northern Drug House, town connection. Applicant must be between 35 and 45, and have had at least 10 years' Wholesale experience with a well-established firm, the greater part of which must have been on the road; none with Retail experience alone need apply; qualification an advantage, but not essential. Reply, with full particulars, including experience, age, and remuneration required, to 209/507, Office of this Paper.

WANTED, first-class Representatives for England, Scotland and Wales, with Chemists, Dentists and Co-op. connections, to handle two real live sellers, supported by advertisements; 10 per cent. commission; give ground covered, how long working, length of journey, etc. 275/40, Office of thie Paper.

WELL-ESTABLISHED Manufacturing Chemiste require Travellers to handle remarkable advertised line on exceptional commission; must have excellent connection; exclusive territory and commission on direct business allowed; state age, lines carried, and territory worked; a substantial income is being made by existing representatives. 209/501, Office of this Paper.

SITUATIONS WANTED.

RETAIL (HOME).

2s. for 18 words or less, 6d. for every additional 10 words or less, prepaid. (Box No., 1s. extra.)

A.A.A.A.A.—UNQUALIFIED Assistant, age 22, Scot, desires position in London; Dispensing, Photography, Window-dressing; free now. Reply "Unqualified," 9 Endsleigh Gardens, N.W.1.

A.A.A.A.—QUALIFIED, 21 (Square trained), desires permanency or Locum; London and provincial experience; sound knowledge all branches; interview appreciated; free. Hitchen, 52 Guilford Street, W.C.1.

A.A.A.A.—QUALIFIED; 28; 12 years' experience, Dispenser, Prescriber, Photography; Optical knowledge; Birmingham district preferred, not essential; moderate salary to start; live in. 276/40, Office of this Paper.

A.A.A.—QUALIFIED, 22 (Square trained), requires Locum or permanency; 6 years' all-round experience; Photography, Optics, Window-dresser; anywhere; free September 26. "Chemist," 77 Stoke Road, Guildford.

A.A.A.—ASSISTANT or relief (referred Pharm. Chem.); free October 1; usual particulars; well recommended; Midlands preferred, but not essential. Hull, 36 Corporation Street, Walsall.

A.A.—QUALIFIED, 37, fair all-round experience, London and provinces, needs post; London preferred. 274/26, Office of this Paper.

A.A.—CAPABLE Assistant, 24, unqualified, desires good-class permanency in or near London; accurate Dispenser and good Counterman; 8 years' London and provincial experience. "Pushful," "Fingle," Devonshire Road, Merton, S.W.

A.—ASSISTANT, 21, desires permanency; 5 years' first-class experience; accurate Dispenser, excellent Counterman; willing; conscientious; distance no object. D. Lovedale, "Cholsdale," Beatty Avenue, Newcastle-on-Tyne.

A.—ASSISTANT, male (Part I), 25; high-class experience, Dispensing, Counter, Photography and Window-dressing; good Prescriber; keen; energetic; has managed. Dakin, 335 Derby Road, Lenton, Nottingham.

A BUSINESS man with town and country experience, unqualified, trustworthy, seeks position as Senior; would re-build neglected business under cover or supervision of principal; at present managing seaside pharmacy; moderate salary. P.C.B. 48/8, Office of this Paper.

A CAPABLE Assistant; 25; unqualified; 7 years' experience, Dispensing, Counter, Window Display, Photographic; permanency; Birmingham or Midlands preferred, not essential. "E. B. D.," c/o 118 Wellington Road, Handsworth, Birmingham.

A YOUNG lady Dispenser, qualified (Hall), requires post. Barton, "Burwell," Meadway, Northampton.

ASSISTANT, unqualified, 35, married, desires permanency; capable Dispenser, thorough experience Retail, Counter, Window-dressing, Photographics (D. & P.). Dodd, 37 Westminster Road, Birchfields, Birmingham, 20.

ASSISTANT; 24; unqualified; finished Part II Course; city, seaside experience; excellent references. "K. G.," 19a Alexandra Villas, Brighton.

ASSISTANT; unqualified; tall; single; disengaged; 30 years' experience, Dispensing, Counter, Photography. Harris, 24 Link Road, Edgbaston, Birmingham, 16.

ASSISTANT; unqualified; accurate Dispenser; temporary or permanent; disengaged September 19. "Statim," 72 Tremadoc Road, Clapham, S.W.4.

AS Manager or Assistant with view to succession in 6 to 12 months; best references; good-class business essential; London area preferred. P.C.B. 47/40, Office of this Paper.

BIRMINGHAM or Midlands preferred; as Manager or qualified Assistant; 5 years' medium- and high-class experience, Dispensing, Counter and Photographic; age 22; excellent references. Massey, 3 Folly Bridge, Oxford.

CHEMIST-OPTICIAN, M.P.S., F.B.O.A., J.C.Q.O., desires change, Managership; keen organiser; lengthy City and provincial experience; expert Window-dresser; intensive knowledge Photography, clever Prescriber, Salesmanship; married; total abstainer; own Optical equipment if necessary; moderate salary with house; excellent references. 277/27, Office of this Paper.

COMPETENT, unqualified Assistant; 40; at liberty shortly; all-round experience; excellent references; permanency desired; Western or Southern Counties preferred. 276/24, Office of this Paper.

COMPETENT, fully experienced Pharmacist desires post as Manager; married; excellent references; interview appreciated. 276/36, Office of this Paper.

DISENGAGED 19th inst.; qualified; Locum (any distance) or part time London district entertained; first-class and all-round experience; good Dispenser. "Pharmacist," 28 Torrington Gardens, N.11

DISPENSING, clerical or management of Drug Store; whole or part-time post desired; lady (Hall); 10 years' experience Chemists and R.P.U. Anderson, 11 Westmorland Road, Harrow.

D. J. WILLIAMS, Chemist, Llanwrtyd Wells, recommends late Assistant; Counter and Dispensing; male; qualified; Square trained. Further particulars from above.

ELDERLY, qualified Chemist desires management, Liverpool; capable; active; reasonable salary. Thomas White, 21 Miller Street, Dingle, Liverpool.

EVENING and week-end employment required in Manchester by a University Student taking Qualifying Course and having had Dispensing experience in the West End, to commence duty on or about October 1. 274/29, Office of this Paper.

FREE.—Locum; October; unqualified; 28; all-round experience, including management; excellent references; conscientious worker. Meyrick, 41 Gordon Street, Coventry.

JUNIOR Assistant; 19; tall; smart appearance; good address; Counter, Dispensing and Photography; excellent references and experience Philp, 28b Seaside, Eastbourne.

JUNIOR requires feur weeks' employment, commencing September 29 (London preferred); 5½ years' all-round experience. Newman, 70 Kennington Park Road, S.E.11.

JUNIOR; 4½ years' experience, Dispensing, Counter, Photography; free end of September. "W. D. S.," 2 Westway Parade, Malvern Road, Bournemouth.

LADY, qualified, Northern Ireland, desires permanency, England; 6 years' experience, Window, Counter, Dispensing; tall; good appearance; excellent references. 273/25, Office of this Paper.

LADY Assistant (unqualified); 11 years' experience; Dispensing, Counter and Window-dressing; age 26. Howell, 29 Henley Street, Stratford-on-Avon.

LADY Assistant; unqualified; 22; experienced in Dispensing, Counter work, Window-dressing. Miller, 43 Goodhind Street, Stapleton Road, Bristol.

LADY, capable, unqualified, requires post end of September; 12 years' experience. Miss Holmes, 39 Bendemeer Road, Putney, S.W.15.

LOCUM; qualified; middle-age; well recommended; sold own business; free September 30. "M.P.S.," c/o Ecclestone, Pharmaceutical Chemist, Stansted, Essex.

LOCUM; qualified; excellent experience, London and provinces; disengaged October 3-8. Howell, c/o Black, Chemist, Tredegar, Mon.

LOCUM, qualified, disengaged September 24, requires further engagements; whole or part time. Lane, 2 Manton Way, Galpins Road, Thornton Heath.

LOCUM or Manager; qualified; competent; experienced, London and provinces; good locum experience. "P.," 11 Dudley Road, Finchley, N.3.

LOCUM or permanency; 40; unqualified; tall; abstainer; Counter, Dispensing, Photography; well recommended; now disengaged. Alexander, 189 Southampton Street, S.E.5.

LOCUM; qualified lady; 26; free now; Hospital or Retail; highly recommended. (Ealing 4063.) Harris, 8 Kerrison Road, W.5.

LOCUM; qualified; 34; disengaged October 3. 'Phone: Rodney 2719. M. Gregory, 50 Grove Lane, Camberwell, S.E.5.

LONDON OR SUBURBS.—Unqualified Assistant; experienced; disengaged; accustomed quick Counter trade, Dispensing; undertake any duty; practical Photographic experience. P.C.B. 48/5, Office of this Paper.

MANAGER of branch pharmacy desires change where Optical experience may be gained; already passed Part I of F.S.M.C. Examination; aged 24; single; good character and personality; excellent references. Write 209/503, Office of this Paper.

MANAGER or Senior; qualified; 42; married; knowledge of all branches of trade; free October 2. Hemingway, 39 Gloucester Road, N.4.

MANAGER or Assistant; unqualified; age 35; West-End experience; good appearance; excellent testimonials; good knowledge of Surgical Appliances. 276/28, Office of this Paper.

MANAGERSHIP desired by keen M.P.S., J.C.Q.O.; 27; experienced busy Counter, considerable Optics, Photography, Truss-fitting, etc.; would introduce Optics; wage and commission; honest; abstainer; excellent references; Midlands preferred. 277/16, Office of this Paper.

MANCHESTER DISTRICT.—Unqualified, 5 ft. 8 in., requires permanency or Locum; capable, smart and trustworthy; fully experienced in all branches of pharmacy. Write "Ephedrine," 51 Shirley Road, Manchester.

MANCHESTER.—Qualified, 25, desires permanency; tall, reliable and trustworthy; recommended; disengaged. "T. R. J.," 19 Holland Road, C-o-H., Manchester.

MR. D. T. EVANS recommends his recently qualified Assistant as being thoroughly efficient in all branches, with good business acumen and personality. Jones, 227 Commercial Road, E.1.

MR. C. GOODE recommends his Assistant for part-time situation (evenings); 7 years' all-round experience; quick, accurate Dispenser; Part I; age 24. G. A. Pitt, c/o Mr. C. Goode, Chemist, Twickenham.

MR. TWEEN, 47 High Street, Bushey, Herts, highly recommends his late Junior (recently qualified); any position; well trained; neat and accurate; experienced in all branches.

M.P.S., 50, seeks permanency; high-class experience, West End and provinces; will accept £3 per week (outdoors) or offer; references good. "Statim," 275/38, Office of this Paper.

M.P.S.; age 22; quick Dispenser, good Salesman and Window-dresser; knowledge of Photography; 6 years' good-class experience in North and South; accustomed to taking charge; highest references; free October 3. Taylor, c/o Knowles, Chemist, 28 Regent Road, Morecambe, Lancs.

PART-TIME; West End or West London; evenings, all day Saturdays; taking Part II course; young; four years' London experience. Mackett, 11 Stowe Road, W.12.

PART-TIME desired, evenings; North London preferred; 10 years' experience. 276/15, Office of this Paper.

PERMANENCY required; Assistant; tall, smart, energetic; 12 years' first-class experience, Counter, Dispensing, Windows; good organiser; capable of taking charge; London or district preferred, not essential. "Statim," 48 Kensington Avenue, Watford, Herts.

PHARMACIST desires position, home, abroad; alert; energetic; ambitious; excellent references and experience, East and West London and provinces. "Radix," 29 Bridge Street, Leatherhead.

PHARMACIST, qualified, Optical Tutor, engaged one half-day, remainder week free, seeks position; Sussex or South Coast; F.B.O.A.(Hons.). 10 Westgate Terrace, S.W.10.

POSITION required as Manager or Assistant; unqualified; 13 years' West-End experience; would invest capital in sound business. "Gentian," Woodchurch Lodge, 18 Woodchurch Road, West Hampstead, N.W.6.

QUALIFIED Pharmacist; 34; English and Foreign Dispensing experience; first-class sales record; London, Midland or South Coast preferred. King, c/o 13 Highgate Hill, N.19. 'Phone: Archway 4114-5-6.

QUALIFIED Assistant; 21; 5 ft. 9 in.; single; Dispensing, Counter, Display, Photographic; exceptional references. Roebuck, "Lea Head," Shepley, Huddersfield.

QUALIFIED, 29, married, earnestly desires permanency; managemnt small Branch preferred. A. H. Brooks, 36 Raeburn Avenue, Dartford, Kent.

QUALIFIED Male, 23, seeks post; tall; abstainer; seaside and West-End experience; capable Dispenser and Counterman, including Toilet and Photographic; free immediately. Fudge, "Alpha," Queen's Road, Blandford, Dorset.

QUALIFIED, young, requires post; competent; all-round experience; excellent references; good appearance and address; £3 10s.; anywhere; free October 9. 276/3, Office of this Paper.

QUALIFIED, 24, seeks Locum or permanency; 7 years' experience, seaside, town and city; reliable and trustworthy; good Window-dresser, capable Dispenser; single; abstainer; terms moderate; disengaged September 22. 277/9, Office of this Paper.

QUALIFIED, 27, male, abstainer, capable, willing, requires permanency; South-Western Counties; 6 years' City and working-class experience. 276/34, Office of this Paper.

QUALIFIED, 28, requires post; preferably management medium- to good-class business; previous sound managerial experience and good references; Yorkshireman. Holmes, 109 Penwortham Road, Streatham, S.W.16.

ROYAL Air Force qualified Dispenser, 29, Scot, 8 years' Hospital experience, including medical store accounting, desires post; Doctor, Institution, or Wholesale Storekeeper. "Secundem Artem," 277/40, Office of this Paper.

SCOTCH; unqualified; 10 years' good all-round experience; Potteries preferred. Stalker, 67 Shelton New Road, Basford, Stoke-on-Trent.

UNQUALIFIED, 22, requires situation as Assistant; South Wales preferred, but not essential; 3 years' experience in high-class Cardiff pharmacy; quick, accurate Dispenser, keen and energetic Counterman, with knowledge of Photography; excellent reference. R. J. Hall, 242 Crogan Hill, Barry, Glam.

UNQUALIFIED; Scot; 20; 4 years' experience, Dispensing and Counter; moderate salary; anywhere. A. Mackie, Sterlochy Street, Findochty, Banffshire.

UNQUALIFIED, 30, married, seeks situation, anywhere; permanency; quick, accurate Dispenser; knowledge Photography; keen; energetic; able take charge. E. Fluck, "Avonmore," Graham Road, Weston-super-Mare.

UNQUALIFIED Assistant desires permanent position; 20 years' all-round experience; capable Dispenser; good Salesman, Window-dresser; reliable references; married. "Chemist," 22 Henry Street, Rugby.

YOUNG lady requires post with Chemist; experienced Counter-hand; no dispensing. "W.," "The Lodge," London Road, Portsmouth.

YOUNG, qualified, 4½ years' London, medium- and working-class, seeks permanency; London area; free now; thoroughly trustworthy. "Selo," 274/28, Office of this Paper.

YOUNG, unqualified lady Assistant; Drug, Toilet; permanency. "Chemist," Normandy Street, Alton, Hants.

NAMES AND ADDRESSES.

When sending advertisements for any of the sections in this Supplement, advertisers—as a guarantee of good faith and not necessarily for publication—should always give their names and addresses. It sometimes occurs that this rule is not followed and delay and disappointment ensues. Strict attention to this detail will be appreciated.

Price lists, trade circulars, samples, and printed matter can in no case be forwarded, the Box numbers being intended exclusively for specific answers to particular advertisements. The Publisher reserves the right to open and refuse to forward any communications received which he may consider contrary to this rule

WHOLESALE.

2s. for 18 words or less, 6d. for every additional 10 words or less, prepaid. (Box No., 1s. extra.)

INDUSTRIAL ADMINISTRATION.

MANUFACTURING CHEMIST, with the following qualifications—
1. Sound Manufacturing experience,
2. Complete knowledge of the Retail trade,
3. Accustomed to the control of staff and purchase of materials,
4. Pharmaceutical Society's qualification,
5. Workable knowledge of property upkeep and reconstruction,

is open to consider an administrative position as Works or Sales Manager, or would be prepared to establish Factory for Continental Manufacturer of Pharmaceutical or Toilet Preparations. P.C.B. 47/39, Office of this Paper.

AMBITIOUS, energetic young man, 23, with 3 years' experience as Representative and good knowledge of the trade, desires post with Drug, Perfumery or Sundries House with view to representing. 277/39, Office of this Paper.

A REPRESENTATIVE, having old-established, live connection Chemists, Hairdressers, etc., experienced Drugs, Toilets, Sundries, requires engagement; highest references. 276/18, Office of this Paper.

B.SC. (Hons. Chemistry), M.P.S., young, desires post in which technical ability could be utilised; some experience of Wholesale. 276/6, Office of this Paper.

REPRESENTATIVE, keen, energetic, 10 years' experience in London and South of England with Proprietaries, Toilets and Perfumery, desires to represent leading House. 276/19, Office of this Paper.

YOUNG Lady (32) seeks responsible position with Chemical Firm as Secretary to Company Director or similar post; thoroughly capable; conscientious; 16 years' experience. 277/11, Office of this Paper.

COLONIAL, INDIAN AND FOREIGN.

CHEMIST, Pharmaceutical Society of Ireland, 24 years, excellent experience and references, has held responsible one year's appointment in India, desires position with firm, preferably Wholesale, India or Colonies. 273/27, Office of this Paper.

FOR SALE.

(Articles to the value of £5-£50.)

FOR Sale, Sect. Bookcase, No. 10 Royal Typewriter, Mod. Desk, Photoscope, Crawford Optical Chair; all perfect; sacrifice prices. Buckingham, 2 Tremadoc Road, Clapham, S.W.

NATIONAL Cash Register for Sale; will ring to 19s. 11½d.; with "paid out" key. Write to T. Wells, 88 Sandilands Road, Fulham, S.W.6.

POROUS MACHINE, hand or power, in excellent condition, suitable for perforating plasters, oiled silk, etc.; spare punches. What offers? P.C.B. 47/28, Office of this Paper.

MISCELLANEOUS.

A FIRST-CLASS PHARMACY, £57 10s.—10 ft. Drug Fixture, 30 drawers, glass knobs and labels, cupboards each side and under drawers; two Show Cases, mirror lined, plate-glass shelves to top section; 6 ft. Mahogany Wall Case; 8 ft. Mahogany Counter, show case front; mahogany and plate-glass Dispensing Screen and Counter, with movable plate-glass shelves. Call or post your requirements. RUDDUCK & CO., 219 and 227 Old Street, London, E.C.1.

A LARGE QUANTITY of Second-hand Showcases from £2 upwards (removed from various jobs); Shop Fittings, Counters, etc., at real reductions. Write requirements or call PHILIP JOSEPHS & SONS, LTD., 90/92 St. John Street, Clerkenwell, E.C.1.

CHEMISTS' FITTINGS.—We hold an immense stock of Drug Fittings, Dispensing Screens, Glass Fronted Counters, Perfumery Cases, Nests of Drawers, Wall Cases, Silent Salesmen, Upright and Flat Counter Cases, Plate-glass Counters, Cash Tills, Display Stands and Glass Shelves, etc., ready for immediate delivery at competitive prices. Write or call for List. F. MAUND & E. BERG (SHOWCASES), LTD., 175/9 and 336 Old Street, London, E.C.1.

CHEMISTS' Fittings, direct from manufacturer; soundly constructed in oak and mahogany; 8 ft. Drug Run, £18; 6 ft. Dispensing Screen, £14; 6 ft. Showcase Fronted Counter, £8 5s.; 6 ft. Wall Case, £11; 6 ft. Glass Counter, £8 15s.; Counter Case 30 x 24 x 18, £2 5s., etc. Send now for photographs, or call and inspect. MYERS, Complete Chemist Fitters, 134a Kingsland Road, E.2, near Shoreditch Church. Bishopsgate 2524.

CHEMISTS' POLISHED OAK FITTINGS.—10 ft. Drug fitting, 8 ft. Wallcase, 8 ft. Glass-front Counter, 6 ft. Dispensing Screen, two 4 ft. Nests Counter Drawers; low price for lot, or separate. Also Sets in Polished Mahogany for any Pharmacy. See-All Dispensing Screen, 6 ft. long; All-glass Counter, 6 ft. long; Silent Salesman, 6 ft. high, 2 ft. x 2 ft. Don't hunt about. Save money and send to GEORGE COOK, The Working Shopfitter (over 40 years' fitting), 27 Macclesfield Street, City Road, E.C.1. 'Phone: Clerkenwell 5371.

PACKING.—London Firm, having ample facilities for Filling, Finishing and Packing Liquids, e.g., Medicinal Preparations, would be pleased to enter into negotiations with manufacturers desiring such assistance. 209/508. Office of this Paper.

£?—COMPLETE CHEMIST FITTINGS at any price you wish to pay. We have erected in our showroom a Complete Chemist Shop with Metal Shop Front, Window Backs, Correct Window Lighting Signs and Modern Interior Fittings. Apply for Lists. D. MATTHEWS & SON, LTD., "The Liverpool Shop Fitters, 14 and 16 Manchester Street, Liverpool. Est. 1848.

EXCHANGE COLUMN.

WANTED.

PEAR-SHAPED CARBOY, about 27 in. in height, or pair smaller. Brown, Chemist, Malvern.

CODEX, 1923; Pharm. Formulas (recent edition). State price. Axtell, 45 Oakthorpe Road, Oxford

SURPLUS STOCKS.—Any saleable goods purchased for spot cash. Send list. 274/8, Office of this Paper.

STUDENT requires cheap Optician's Trial Case; must be complete. Particulars and price to K. Adams, 17 Grovelands Avenue, Swindon.

We desire particularly to draw the attention of Colonial and Foreign Subscribers to the fact that in cases where they require Partners, Agents or Assistants, or wish to Sell their Businesses, an Advertisement in this Supplement, placed in every copy of "The Chemist and Druggist," should be the readiest means of helping them to attain their object. The tariff for such announcements is given on the front page of this Supplement. Instructions and remittances can be sent to us direct or through the advertisers' correspondents in this country.

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